



National  
Defence

Défense  
nationale

B-GL-304-002/PT-Z05

**TRAINING FOR WAR**

**VOLUME 2**

**FIELD TRAINING REGULATIONS**

**SUPPLEMENT 5**

**WARRIOR PROGRAMME  
HANDBOOK**

**(ENGLISH)**

Issued on Authority of the Chief of the Defence Staff

**Canada**



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Contact Officer: Director of Doctrine

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## **FOREWORD**

### **APPLICATION**

1. B-GL-304-002/PT-Z05, Training for War, Volume 2, Field Training Regulations, Supplement 5, Warrior Programme Handbook is issued on the authority of the Chief of the Defence Staff and is effective upon receipt, for use in regular and militia units.

### **REVIEW AND COMMENTS**

2. Suggestions for change are to be forwarded to the Director of Doctrine, Kingston.

### **LOG SHEET**

3. The log sheet on the following page constitutes the official record of results on the Warrior Programme obtained by the holder of this copy of the Warrior Programme Handbook.

### **FRENCH VERSION**

4. The French version of this handbook is published under B-GL-304-002/PT-Z06 Manuel du programme d'aguerrissement.



## WARRIOR TRAINING PROGRAMME LOG SHEET

Name : \_\_\_\_\_ Rank : \_\_\_\_\_ MOC : \_\_\_\_\_

BTS	TRAINING YEARS								REMARKS
C7									
C9 (LMG)									
SRAAW(L)									
SRAAW(M)									
C6 GPMG									
M67									

P - Pass F - Fail E - Equivalency

WARRIOR TRAINING PROGRAMME LOG SHEET (CONT'D)

Name : \_\_\_\_\_ Rank : \_\_\_\_\_ MOC : \_\_\_\_\_

BTS	TRAINING YEARS						REMARKS
FIELD CRAFT							
BATTLE CRAFT							
NAVIGATION							
VOICE PROCEDURES							
NBCD							
FIRST AID							
MINE AWARENESS							
3.2 KM							

P - Pass      F - Fail      E - Equivalency



RECORD OF CHANGES

Identification of Change		Date Entered	Signature
Change No.	Date		

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**CHAPTER 1****INTRODUCTION****SECTION 1****GENERAL MILITARY KNOWLEDGE****RANK STRUCTURE**

1. The origin of rank predates the Roman era. It is said to have originated with field commanders requiring an emblem which would distinguish those of their forces who had proven to be braver and more resourceful than the average soldier. The commanders of the day did not want to have these fighters slaughtered during normal battle activities, as they were relied upon to intimidate their own fighting hordes, to prevent them from turning on their own leaders or to kill each other out of boredom. Since then, rank and the manner in which it is identified, has evolved substantially throughout the world. Today, modern armies generally indicate an individual's depth of training and experience through the many rank insignia that are presently used.

2. The rank structure of the Canadian Forces is based on that of the British. Since the integration of the Canadian Forces in 1966, there have been only slight differences in rank insignia between the Navy, Army and Air Force. Albeit, the Navy addresses personnel with rank differently than does the Army. The Canadian Forces has two basic rank structures, one for non-commissioned personnel and the other for officers. Everyone carrying rank in the Forces has earned that rank, by meeting the prerequisites for that rank and by having their superiors promote them to it. Usually the easiest task after a promotion, is sewing the new rank on your uniform. Thereafter, if you are going to be a positive influence, leadership becomes a serious responsibility, demanding your dedication and loyalty along the chain of command, especially to the troops that you are responsible to look after. Don't be

in a hurry to get promoted through the ranks as quickly as possible. Do your job to the best of your ability and be proud of your rank. If you have to say, "I am only.....", you are not doing it right.

3. The mere fact that you have the authority to wear a rank does not give you the right to mishandle, abuse or insult anyone that may be working for you. One tried and true application of rank is to carry out your duties in a firm, fair and friendly manner. Yelling for the sake of yelling, intimidation and disdain do nothing but show ineptness, and are no match for compassion, integrity and responsibility.

"NO ONE CARES HOW MUCH YOU KNOW...  
UNTIL THEY KNOW HOW MUCH YOU CARE."

## CANADIAN FORCES RANK STRUCTURE



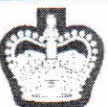




INSIGNIA	DESCRIPTION	SHORT TITLE	RANK	ADDRESSED AS
	Coat of Arms of Canada	CWO CPO1	Chief Warrant Officer Chief Petty Officer 1st Class	Sir Chief
	Crown surrounded by laurels	MWO CPO2	Master Warrant Officer Chief Petty Officer 2nd Class	Sir Chief
	Crown	WO PO1	Warrant Officer Petty Officer 1st Class	Warrant PO
	Three chevrons apex down, with maple leaf	Sgt PO2	Sergeant Petty Officer 2nd Class	Sergeant PO
	Two chevrons, apex down, with maple leaf	MCpl MS	Master Corporal Master Seaman	Master Corporal
	Two chevrons, apex down	Cpl LS	Corporal Leading Seaman	Corporal
	One chevron, apex down	Pte AB	Private (trained) Able Seaman	Private
	No insignia worn	Pte OS	Private (recruit) Ordinary Seaman	Private

Figure 1-1-1 Non-Commissioned Members Rank Insignia  
1-1-3






INSIGNIA	DESCRIPTION	SHORT TITLE	RANK
	two 1/2 in braids (two "thick" bars)	Capt LT (N)	Captain Lieutenant (N)
	one 1/4 in braid over one 1/2 in braid (one "thick" and one "thin" bar)	LT SLT	Lieutenant Sub-Lieutenant
	one 1/2 in braid (one "thick" bar)	2LT A/SLT	Second Lieutenant Acting Sub-Lieutenant

Figure 1-1-2 Commissioned Officers - Junior Officers

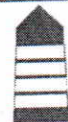


INSIGNIA	DESCRIPTION	SHORT TITLE	RANK
	four 1/2 in braids (four "thick" bars)	Col Capt (N)	Colonel Captain (N)
	three 1/2 in braids (three "thick" bars)	LCol Cdr	Lieutenant- Colonel Commander
	one 1/4 in braid between two 1/2 in braids (two "thick" bars with a "thin" bar in the middle)	Maj Lt-Cdr	Major Lieutenant- Commander

Figure 1-1-3 Commissioned Officers - Senior Officers





INSIGNIA	DESCRIPTION	SHORT TITLE	RANK
	Crossed sword and baton, crown and four maple leaves	Gen Adm	General Admiral
	Crossed sword and baton, crown and three maple leaves	LGen VAdm	Lieutenant-General Vice-Admiral
	Crossed sword and baton, crown and two maple leaves	MGen RAdm	Major General Rear-Admiral
	Crossed sword and baton, crown and one maple leaf	BGen Cmdr	Brigadier-General Commodore

Figure 1-1-4 Commissioned Officers - General Officers

**NOTE:**

1. Officer Cadet is not a commissioned rank. It is known as a subordinate officer rank.
2. All officers are addressed as "Sir" or "Ma'am".
3. "Lieutenant" is pronounced as "Leftenant"; i.e., "Leftenant-Colonel" or "Second Leftenant".

## **FORCE**

4. Definition of Force. Force is the application of increased levels of threats to, or physical contact with, a person whose actions or demeanour are opposed to the orders that you are charged to enforce. This can range from attempting to persuade that person to submit to your orders, to more extreme action which may include the discharge of a firearm at that person when you feel the individual intends to coerce, disable or kill those whom you are protecting. The use of deadly force is a last resort, which may only be justified in the most exceptional circumstances.

5. Personnel assigned to protect a controlled access area must be trained in the duties and responsibilities associated with the protection of persons and property and in the appropriate use of all levels of force. You must be totally conversant with the legalities pertaining to such duties and responsibilities. For each case you will receive specific instructions with regard to your personal liabilities for the excessive, inappropriate or unauthorized use of force. In other words, if you are not completely satisfied that you fully understand the duties that you are about to perform, let the person in charge know that fact immediately.

6. The person in charge is responsible to produce, for your retention, a copy of written orders, detailing the authorized use of force, when charging you with the responsibility of protecting persons and property as an armed guard.

## **USE OF FORCE**

7. The use of force, within the limitations of the law, may be authorized for the protection of controlled access areas, (for example, a temporary ammunition storage site), and for the protection of persons working in and around such areas. Any degree of force used in the protection of such areas, or of the personnel working there, is subject to full justification under the terms prescribed by the Criminal Code of Canada. Security guards must be guided by the principle that a court

may wish to determine if the action(s) taken were, in a given circumstance, reasonable and necessary.

8. Use of Force by a Guard. When justified, a guard may use as much force as is reasonably necessary for self-protection against violence, and to prevent the commission of an offence against persons or property.

9. Decision to Use Force. Security guards authorized by their commanders to use force in a controlled access area or to protect persons therein, should use the following criteria for determining whether force at any level is warranted. The decision to use force should not be made until the following are considered:

- a. the seriousness of the situation or incident;
- b. whether or not the use of force will in fact be effective;
- c. the level of force appropriate to neutralize the threat;
- d. the method of application of force necessary;
- e. the extent to which force must be applied without delay;
- f. the necessity for immediate assistance in order to apply the force; and
- g. the time available to report the situation to a superior, considering all the circumstances.

#### **ORDERS**

10. When you are tasked to be an armed guard, you must fully understand the orders covering that specific task. The orders should include the following:

- a. use of force - general,

- b. use of firearms,
- c. training requirements,
- d. safety procedures,
- e. guard instructions, and
- f. control and supervisory chain of command.

#### **ARMED ESCORTS**

11. In order to be easily identified, personnel employed as armed escorts will at all times wear on their upper right arm, an armband or brassard clearly displaying a bright yellow square measuring not less than 10 centimetres by 10 centimetres. These armbands will not be covered, concealed, toned-down or camouflaged in any way. Magazines containing live ammunition will have their baseplate coloured bright yellow, using permanent non-washable paint, or in an emergency, good quality yellow tape. This marking also can not be concealed in any way.



## SECTION 2

### GENEVA CONVENTIONS

#### PURPOSE

1. The purpose of the Geneva Conventions is to improve the condition of war victims and to reduce the suffering caused by war. They were inspired by universal respect for human individuality, dignity and moral principles. The conventions currently supported by Canada were signed in 1949 and consists of four separate conventions:

- a. the wounded convention;
- b. the maritime convention;
- c. the prisoner of war convention; and
- d. the civilian convention.

2. We have all heard the myriad of horror stories that describe mankind's inhumanity to one another. Thanks to the media, we continuously witness atrocities and barbarism which are symbolic of many of today's world conflicts. This leads us to question what kind of human being it is, who would willingly treat others in such despicable fashion. The heat of the moment, fear, hate, exhaustion, revenge and hunger, are all reasons that, together or individually, can turn an otherwise compassionate person into one who will commit unthinkable acts against another. It is your responsibility to be aware of this and to treat all human beings, no matter what the situation and regardless whether they are a real or perceived enemy, in the same manner as you would have them treat you, should you be captured, wounded, or caught up in a conflict as a civilian.

### **TREATMENT OF PRISONERS OF WAR**

3. Prisoners of War must be treated humanely, and protected from acts of violence, intimidation, insults and public curiosity. They are entitled to respect, in all circumstances. Retaliation or reprisal against PWs is not acceptable. PWs are deprived of arms, but may keep any equipment issued them for personal protection. They are also entitled to keep their personal documents. Money and valuables may be taken from a PW by an officer upon the issue of a detailed receipt. The location of PW compounds must be safe from shelling and bombing. The living conditions must be at least as good as those provided for the troops of the capturing force in the local area. The quarters must be clean, dry, adequately heated, lighted and have suitable bedding and sleeping facilities. Hygienic conveniences, messing facilities, food and clothing to suit the climate, must all be provided at the same standard as is given the capturing force. Access to medical care is a must. PWs may practise their religion within the framework of camp discipline. Physical exercise should be allowed in open spaces.

### **TREATMENT OF WOUNDED AND SICK**

4. People who have been wounded or are otherwise ill, must be treated in a humane manner. All possible measures must be taken without delay, to search for and collect the wounded and sick, protect them and provide adequate care. Looting must be prevented. Any sick or wounded who fall into the hands of the enemy are considered PWs. Medical facilities are not to be attacked, unless members of those facilities commit acts which are harmful to your troops (ie, harbouring troops or war materials). When required, local inhabitants may be asked to care for sick and wounded, and be given provisions if they agree. Wounded may not be abandoned without medical assistance.

#### TREATMENT OF CIVILIANS

5. Civilians are to be treated humanely at all times, respecting their honour, family rights, religion, manners and customs. They are to be protected from all acts of violence. The following measures are prohibited:

- a. using civilians to make areas immune to attack;
- b. using physical or moral coercion to get information;
- c. punishment for offenses not committed;
- d. collective penalties;
- e. terrorism or intimidation;
- f. pillage;
- g. reprisals against civilians and their property;
- h. detaining civilians in war exposed areas;
- i. forcing civilians under 18 years of age to work;
- j. compelling any civilian to take part in military operations;
- k. any attack on the honour of women, in particular rape, enforced prostitution or any form of sexual assault or harassment; and
- l. seizing of supplies out of the local stocks, without consideration for the needs of the local population.

## GRAVE BREACHES

6. The nations which have ratified the conventions are bound and obligated to search and detain all persons who have committed grave breaches of any convention. A grave breach is one of the following:

- a. willful killing, torture, or inhumane treatment including biological experiments;
- b. wilfully causing great suffering, or serious injury to body or health;
- c. compelling a person to serve in the forces of a hostile power;
- d. wilfully depriving a person of the right to fair and regular trial, as prescribed in the conventions;
- e. unlawful deportation, ethnic cleansing, or confinement of civilians;
- f. taking of civilian hostages; and
- g. extensive destruction and appropriation of property, not justified by military necessity, and carried out unlawfully and wantonly

## CONDUCT AFTER CAPTURE

7. Prisoners are taken during virtually any conflict. However, you must not submit to being taken prisoner without exhausting every avenue available to you to avoid it. If a member of the Canadian Forces is made a prisoner due to neglect of duty, or because the required precautions were not taken, then that person is guilty of an offence, and may be subject to disciplinary action. Canadian soldiers must seize every opportunity to rejoin the Canadian Forces after capture. Under no circumstances, will a Canadian prisoner serve or aid

the enemy after capture. Upon capture, a prisoner of war will only give the following:

- a. service number,
  - b. rank,
  - c. surname and given name, and
  - d. date of birth.
8. Prisoners should attempt everything possible, even under duress, to not divulge anything which might incriminate a fellow prisoner. Moreover, prisoners of war must not work for or engage in enemy propaganda activities.

#### CONCLUSION

9. The Geneva Conventions apply to all service personnel involved in operations or UN duties. Contravention will result in discredit to the Canadian Forces and probable criminal charges for those who violate any facet of the conventions. These conventions apply to you as a possible prisoner of war, as well as the soldier who may be tasked to care for enemy prisoners of war, or civilians ordered to be temporarily detained by you. As indicated previously, long hours of duty and the stress of the situation, may have you act or think in a manner that you would otherwise be horrified with, when you are serving in areas of the world where the preservation of human dignity and life itself are regarded as the cheapest of commodities by the local population.



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**CHAPTER 2**

**SERVICE RIFLE 5.56 mm C7**

**SECTION 1**

**CHARACTERISTICS, TECHNICAL DATA  
AND SAFETY PRECAUTIONS**

**CHARACTERISTICS AND TECHNICAL DATA**

1. The characteristics of the C7 service rifle are as follows:
  - a. gas-operated,
  - b. magazine-fed,
  - c. air cooled,
  - d. semi and fully automatic,
  - e. capable of quick and accurate fire at short range opportunity targets,
  - f. capable of a high rate of accurate and rapid fire at ranges up to 300 metres,
  - g. a section can concentrate effective fire up to 600 metres,
  - h. can be fitted with a bayonet for close quarter fighting,
  - i. magazine holds 30 rounds,
  - j. weight 3.3 kg unloaded, and 3.8 kg fully loaded, and

- k. as a result of the weapons fully automatic capability and 30 round magazine a high standard of fire control is necessary to prevent wasting ammunition.
- 2. The technical data for the C7 is as follows:
  - a. Calibre. 5.56 X 45 mm NATO.
  - b. Weight:
    - (1) rifle unloaded - 3.34 kg, and
    - (2) loaded - 3.89 kg.
  - c. Length:
    - (1) rifle - one metre,
    - (2) barrel - 0.53 m, and
    - (3) sight radius - 0.50 m.
  - d. Rifling. six groove, right hand, one turn in 178 mm.
  - e. Modes of fire. Repetition and automatic.
  - f. Operation. Gas operated, air cooled, magazine fed.
  - g. Sights:
    - (1) iron sights, small aperture 200 to 300 m, large aperture for Close Quarter Combat and low light at increments of 100 m;  
or
    - (2) C79 optical sight.
  - h. Maximum effective range. 400 m.

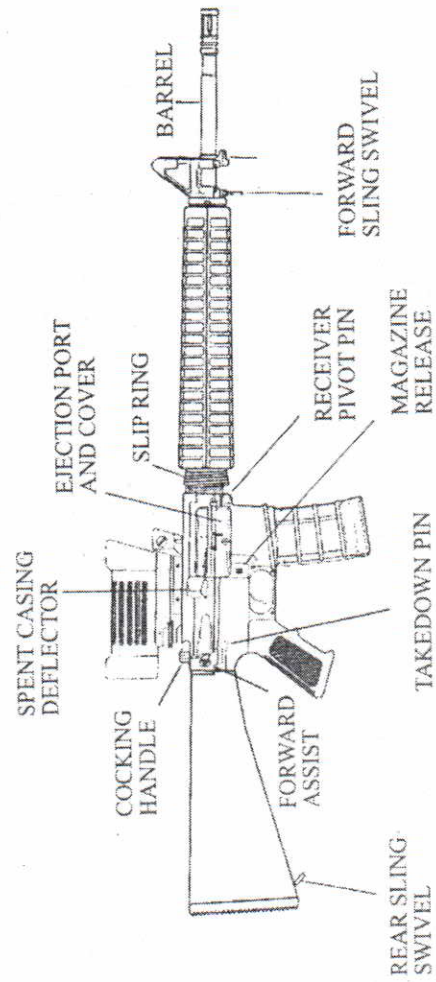


Figure 2-1-1 C7 Service Rifle - View From Right

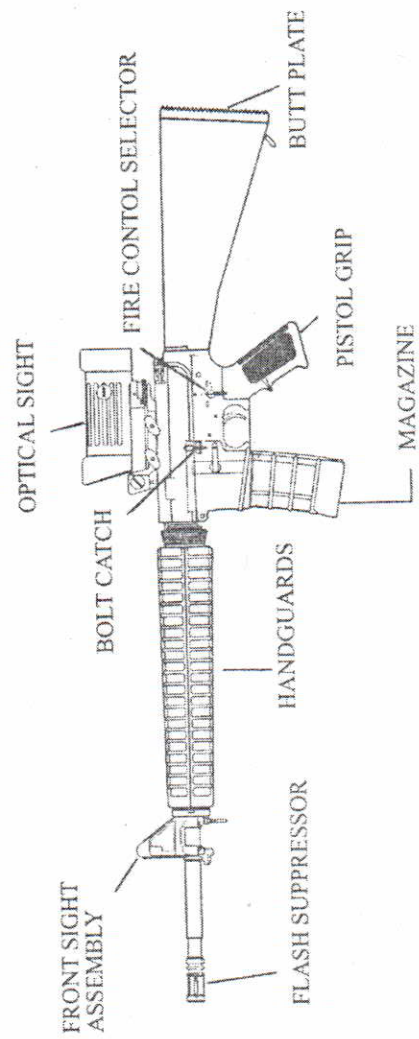


Figure 2-1-2 C7 Service Rifle - View From Left



### SAFETY PRECAUTIONS

3. There are many situations for which you must perform safety precautions. These include:
  - a. before and after instruction,
  - b. before stripping,
  - c. during issue and return to stores,
  - d. before and after any range practice, and
  - e. whenever the safety status of the weapon is in doubt.
4. On the word of command **"FOR INSPECTION - CLEAR WEAPONS"**, you will:
  - a. adopt the standing load position;
  - b. cock the weapon and engage the bolt catch;
  - c. return the cocking handle to the forward locked position; and
  - d. tilt the weapon to the left and wait for inspection.
5. On the word of command **"CLEAR"**, you will:
  - a. pull the cocking handle to the rear and allow the action to go forward under control;
  - b. fire the action and close the ejection port cover;
  - c. ground the rifle with the ejection port uppermost, unfasten your magazine pouches and remove the magazines from the pouches in preparation for inspection; and

- d. once the magazines have been inspected, replace them, pick up the rifle and stand at ease.
- 6. Other safety practices include:
  - a. safe handling with no magazine fitted:
    - (1) when handing a rifle to another soldier, or accepting one yourself, point the muzzle in a safe direction, pull the cocking handle to the rear and hold it there;
    - (2) inspect to ensure the chamber is clear;
    - (3) allow the action to go forward under control; and
    - (4) fire the action and close the ejection port cover.
  - b. never point the rifle at anyone in jest; and
  - c. never fire the rifle with blank ammunition within 20 m of anyone.

## SECTION 2

### STRIPPING, ASSEMBLING AND CLEANING

#### FIELD STRIPPING

1. There are two types of stripping: field and detailed. Field stripping is the method of disassembling the rifle for cleaning and maintenance in the field. Field stripping is carried out as follows:

- a. complete safety precautions, but do not operate the trigger;
- b. set selector lever at "S";
- c. pivot the upper receiver group down by withdrawing the take down pin;
- d. pull the cocking handle partially to the rear and pull the bolt carrier group out of the upper receiver;
- e. push the cocking handle fully forward;
- f. remove the retaining pin from the bolt carrier and slide out the firing pin;
- g. rotate the cam pin one quarter turn and remove it from the bolt carrier;
- h. pull the bolt out of the bolt carrier; and
- i. strip the magazine. (DO NOT STRIP THE BOLT)

## DETAILED STRIPPING

2. Detailed Stripping is conducted for comprehensive cleaning. In preparation, field strip the rifle. Detailed stripping is then carried out as follows:

- a. push the extractor retaining pin out from the bolt;
- b. do not separate the extractor retaining spring from the bolt;
- c. remove the hand-guards by pulling the hand-guard slip-ring toward the upper receiver;
- d. push the pivot pin in on the left side of the rifle, and pull it out to its full extent from the right side of the rifle, then separate the upper receiver from the lower receiver;
- e. remove the cocking handle;
- f. remove the buffer and return spring; and
- g. separate the buffer and return spring.

### WARNING

YOU WILL NOT STRIP THE WEAPON FURTHER.

## ASSEMBLING

3. In each case the weapon is assembled in the reverse order.

### NOTE

When placing the bolt into the bolt carrier, ensure that the cam pin hole with the two indentations is at the

bottom. Ensure that the bolt is fully forward in the bolt carrier, prior to placing it into the upper receiver. Ensure that the selector lever is at "S". If the selector lever is at "AUTO", the automatic sear will interfere with the bolt carrier when the upper receiver is closed down upon the lower receiver.

4. Regardless of the location or training situation under which you are required to strip and assemble your rifle, you must always ensure that a fully assembled weapon is always pointing in a known safe direction before you operate the trigger.

#### FUNCTION TEST

5. To ensure that your rifle is correctly assembled and operates as required, you must perform a function test as follows:

- a. cock the rifle;
- b. with the selector lever at "S", attempt to fire the rifle, it should not fire;
- c. set the selector lever to "R";
- d. squeeze the trigger, and fire the action;
- e. while holding the trigger back, cock the action and release the trigger;
- f. the hammer should be felt and heard to fall from the disconnecter; then to be caught immediately by the trigger sear;
- g. squeeze the trigger the action should fire;

- h. set the selector lever to "AUTO". Cock the rifle. The hammer should be held by the automatic sear. Squeeze the trigger and fire the action;
- i. while holding the trigger to the rear, cock the action. As the bolt carrier moves fully forward, the hammer should fall to strike the firing pin. Release the trigger; and
- j. set the selector lever to "R". Close the ejection port cover.

#### CLEANING

6. The C7 is maintained through proper cleaning and inspection. When properly maintained, it will operate with few stoppages. Daily cleaning is important preventative maintenance which ensures the rifle remains serviceable. Cleaning the rifle is conducted as follows:

- a. clean the chamber;
- b. clean the flash suppressor;
- c. clean and pull-through the barrel;
- d. clean the bolt and carrier;
- e. clean the ejector;
- f. lubricate the bolt and carrier;
- g. clean and lightly lubricate the exterior of the upper receiver;
- h. clean the exterior of the gas tube which protrudes into the receiver;
- i. clean and lubricate the inner surfaces to the upper receiver;
- j. depress the front sight detent and apply two or three drops of CLP;



- k. clean the interior and exterior of the lower receiver;
- l. clean the drain hole and the butt;
- m. clean the inside of the buffer tube, lubricate the buffer and spring and interior of the buffer tube. Apply CLP generously to the trigger group, take down pin and pivot pin;
- n. clean the external surfaces of the butt and hand-guards, but do not oil; and
- o. clean the magazines.

**NOTE**

Never use abrasive material or wire brushes on the aluminium surfaces. This will remove the metal's protective coating.

7. Cleaning Before Firing. Cleaning before firing is carried out to ensure that the weapon is serviceable and free of excess CLP. Chamber pressures can be increased as a result of excess CLP, which may damage the weapon and possibly injure the user. The following is the procedure for cleaning before firing:

- a. carry out daily cleaning; and
- b. remove CLP from the bore, the face of the bolt, the chamber, the gas tube and bolt key.

**NOTE**

Ensure gaps in the rings on the bolt are staggered to prevent gas loss.

8. Cleaning During Firing. If possible the weapon should be cleaned, during lulls in firing, to prevent stoppages. Cleaning during firing is carried out as follows:

- a. field strip the weapon;
- b. pull the barrel through with a CLP laden swab;
- c. pull the barrel through with a dry swab;
- d. clean the exterior of the bolt group assembly;
- e. clean the bolt key with a pipe cleaner;
- f. clean and lubricate the slide and cam;
- g. clean and lubricate locking lugs and shoulder assembly; and
- h. carry out the function test.

9. Cleaning After Firing. Cleaning after firing removes fouling, carbon and foreign matter from the rifle. If possible, clean the rifle immediately after firing. The heat retained by the rifle aids the CLP in removing carbon. If the rifle can not be cleaned immediately after firing, apply a light coating of CLP. After firing and the initial cleaning, the weapon must be cleaned once every 24 hours, for 72 hours.

#### ADVERSE CONDITIONS

10. Adverse Conditions. Special cleaning measures are necessary in adverse conditions, to ensure the weapon remains clean and serviceable. These special considerations are as follows:

- a. in hot, dusty and sandy environments, the rifle must be kept dry. In warm climates, moisture, humidity and salt from your own perspiration will quickly generate rust. If rust appears, remove it by rubbing with CLP. Always take care to wipe away any CLP that was used to remove the rust from the weapon;

- b. in extremely cold climates, if the tactical situation permits, to prevent the working parts from freezing together, unload and cock the rifle two or three times every 30 minutes. When bringing the rifle into shelters it must be stripped and wiped dry several times as it reaches room temperature. A light coat of CLP will provide lubrication down to -10C; and
- c. to prevent rusting under tropical or high humidity conditions, inspect and clean the rifle more frequently. Inspect the hidden surfaces of the bolt and cam assembly, upper receiver, chamber, locking lugs, lower receiver and buffer tubes for rust. Pay special attention to spring loaded detents and plungers. Always remove hand prints from the weapon with a rag to prevent rust. Keep ammunition dry.

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**SECTION 3****SIGHTS****OPTICAL SIGHTS**

1. The C79 Optical Sight has been adopted as a standard sight for the C7, C8 and C9. The carrying handle has been removed from the C7/C8 to accommodate the sight. The optical sight is located on the upper receiver. It is adjustable for ranges from 200 to 800 m in 100 m increments. To adjust the sight for elevation, turn the range elevation dial until the range required is opposite the white line on the side of the sight. For quick alignment purposes, the sight is also fitted with a notch and post device moulded to the top of the rubber housing. It will provide you with a rough sighting onto a specific target for situations where multiple, closely spaced, targets exist. To ensure that you are shooting at your target of choice, you should roughly sight your rifle using the alignment sight and then take correct and customary aim with the optical sight.

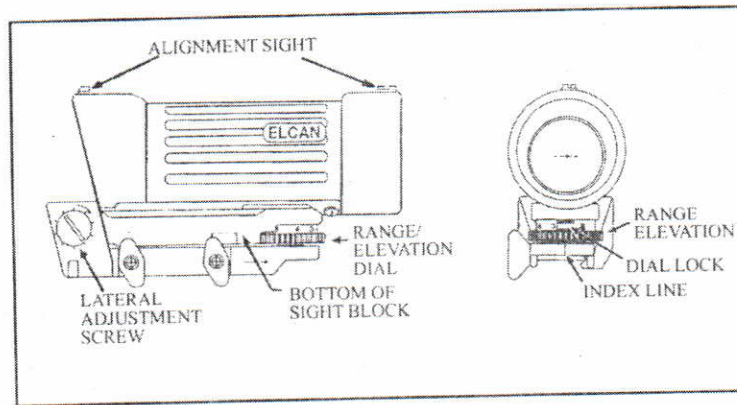


Figure 2-3-1 C79 Optical Sight

### FIXED SIGHTS

2. This rifle was originally fitted with fixed iron sights. The front sight is a single blade mounted at mid-barrel and can be adjusted for height and direction. The rear sight is a flip type with two apertures. The larger aperture is for close-quarter battle and for engaging targets at ranges under 50 metres. The smaller aperture is used for engaging targets at distances greater than 50 metres.



## SECTION 4

### HANDLING DRILLS

#### LOAD

1. The rifle is **LOADED** when it is fitted with a magazine. It is **PREPARED TO FIRE** when the sight is set, the action is cocked and a round is chambered. It is **UNLOADED** when no magazine is fitted and the chamber is clear.
2. On the order, "**LOAD**", the following drill will be completed:
  - a. adopt the standing-load position, hold the rifle by the pistol grip, forefinger outside the trigger guard, muzzle pointed upward;
  - b. unfasten the ammunition pouch and remove a magazine. Check that the rounds are positioned correctly and push it firmly into the magazine housing ensuring that it is secure. DO NOT HIT THE BOTTOM OF THE MAGAZINE; and
  - c. secure the ammunition pouch.

#### READY OR RANGE

3. On the order, "**READY**", or a range being ordered, the following drill will be completed:
  - a. ensure that sights are at the correct setting;
  - b. cock the rifle;
  - c. ensure the bolt carrier moves fully forward, **DO NOT RIDE THE COCKING HANDLE**;
  - d. push the forward assist assembly;

- e. close the ejection port cover; and
- f. set the selector level to "S".

#### **UNLOAD**

- 4. On the order, "**UNLOAD**", the following drill will be completed:
  - a. set the selector lever to "S" and undo the magazine pouch;
  - b. remove the magazine and place it in the magazine pouch;
  - c. point the muzzle upward, tilt the rifle to the right and pull the cocking handle to the rear twice;
  - d. hold the cocking handle to the rear, tilt the rifle to the left and look to ensure that the chamber is empty;
  - e. let the cocking handle go forward;
  - f. set the selector lever to "R", squeeze the trigger and close the ejection port cover; and
  - g. recover the ejected round, clean and replace it in the magazine, return the magazine to the pouch and fasten the pouch.

#### **MAKE SAFE**

- 5. On the order, "**MAKE SAFE**", the following drills will be completed:
  - a. unload; and
  - b. load.

#### SAFE HANDLING WITH A MAGAZINE FITTED

6. Once ordered to "LOAD" the rifle, you are responsible for keeping it loaded until ordered to "UNLOAD". You are responsible for the safe handling of the rifle and must ensure:

- a. when it is ready to fire, the selector lever is always at "S" unless ordered to "Fire";
- b. the rifle is always unloaded when you are no longer able to ensure it's safe handling, once handed over to another person or left under guard while you are performing other duties;
- c. on the range, the muzzle is always pointed in the direction of the target;
- d. if a rifle is picked up with a magazine fitted, it is to be unloaded immediately; and
- e. the rifle is never pointed at anyone in jest.

#### IMMEDIATE ACTIONS AND STOPPAGES

7. If the rifle fails to fire or stops firing, the immediate action is to cant the rifle to the left and look into the ejection port at the position of the bolt:

- a. if the bolt is to the rear;
  - (1) check for an empty magazine and change magazines;
  - (2) operate the bolt catch and push the forward assist; and
  - (3) re-aim and continue firing;

b. if the bolt is fully forward;

- (1) physically check the magazine to ensure it is fully seated and locked in place;
- (2) cock the rifle and watch for the ejection of a round or empty casing;
- (3) if a round or casing is ejected, push the forward assist;
- (4) re-aim and continue firing; and
- (5) if no empty casing or round is ejected attempt to continue firing, if the rifle fails to fire, further action must be taken; and

c. if the bolt is partially forward;

- (1) cock the weapon and push in the bolt catch;
- (2) examine the chamber and body of the weapon;
- (3) if a live round or empty casing is in the body or chamber, remove the magazine;
- (4) clear the obstruction;
- (5) replace the magazine;
- (6) operate the bolt catch and push the forward assist; and
- (7) re-aim and continue firing.

8. Further Actions. If an obstruction in the chamber cannot be removed during the initial remedial action or if the stoppage re-occurs, the following actions will be taken:

- a. unload the weapon, remove the take down pin and remove the

- bolt carrier and bolt;
  - b. examine the extractor;
  - c. test the ejector;
  - d. test the firing pin protrusion; and
  - e. report faults to a weapons technician.
9. If the chamber does not appear to be obstructed and there are no broken parts, examine the chamber for a separated casing and report faults to a weapons technician.

#### **MAGAZINE FILLING**

10. There are two methods of filling magazines:
- a. using a charger:
    - (1) position the magazine on a firm surface and ensure the back of the magazine is facing away from you;
    - (2) fit the magazine charger onto the magazine and ensure it is fully seated; and
    - (3) place a 10 round clip into the charger and push the rounds down with the thumb until all rounds are fed.

b. filling with loose rounds:

- (1) hold the magazine in the same manner used with the charger; and
- (2) push the rounds into the magazine one at a time.

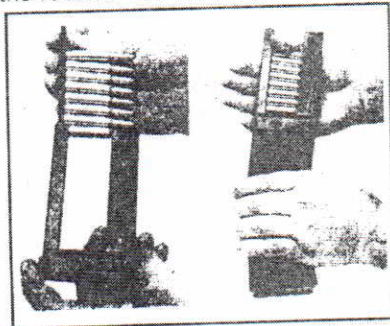


Figure 2-4-1 Magazine Filling



## SECTION 5

### HOLDING AND AIMING

#### HANDLING PROFICIENCY

1. You must be able to apply the theory of marksmanship, as detailed in the 'Shoot to Live' program, to achieve the required standard of proficiency for handling the rifle. When shooting any weapon, an attitude of "good enough" is never good enough, therefore, you should also always consider the following aids to good shooting.

2. Holding. To achieve the best results, you must hold the rifle firmly enough to achieve a rock-like steadiness, while positioning your body to have it remain in a natural and comfortable state. The following must be practised:

- a. support the rifle at the forestock with the left hand. The left elbow is to be placed so that it is directly under the rifle. The left wrist and forearm should rest against the magazine, providing additional steadiness. The right elbow must be drawn into the body as close as possible in order to create the steadiest possible position;
- b. hold the pistol grip with the right hand, having the forefinger resting lightly on the trigger. Pull the rifle into the shoulder;
- c. rest the right cheek against the side of the butt and exert pressure both sideways and downwards. The cheek bone should be situated on top of the butt with 3" to 4" eye relief from the rear aperture when using iron sights. For the C79 Optical Sight you must position the head so that the entire sight picture is visible;
- d. ensure that the head and rifle remain in a perpendicular unison at all times;

- e. the rifle must be held firmly enough so that it does not move when the trigger is pressed. However, it must not be held so tight that vibrations of straining muscles are transferred to the rifle; and
  - f. it is essential that you always hold the rifle in exactly the same manner, as variations in hold will cause you to have pepper shot results rather than pinpoint accuracy;
3. Aiming. A correct sight picture along with correct body and sight alignment, will ensure you are always on target. Remember the following:
- a. when looking through the aperture of the rear iron sight, you will notice that the area near the edges is blurred and that a central smaller circle is clear, allowing you to see objects normally. Always align your sight using only the clear central circle;
  - b. it is important to always achieve the same aim picture just before firing, regardless of the position that you have adopted. An example of correct sight pictures is shown below; and

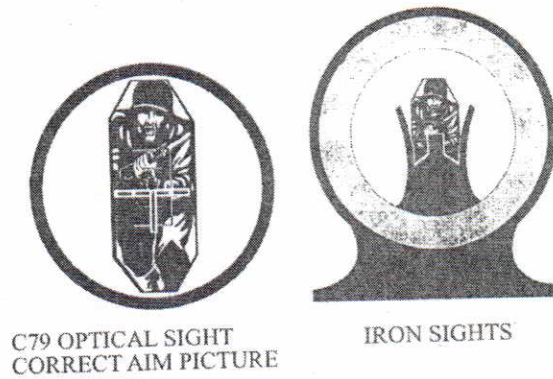


Figure 2-5-1 Aiming

- c. to become proficient with the rifle you must always employ the rules of aiming by closing the disengaged eye, looking through the centre of the rear aperture at the target and selecting a point of aim. Keeping the sights upright align the tip of the foresight blade on the point of aim and finally ensure that the point of aim is in the exact centre of the rear aperture;
4. Breathing. When the rifle is held correctly and aimed in the prone position, the tip of the foresight moves up and down on the target as the lungs are inflated and deflated. With the lungs fully inflated, the foresight will be at the lowest point in relation to the target. As the lungs are deflated fully, the foresight will reach it's highest point on the target. Your firing position should be adjusted slightly so that the aim picture remains correct when your lungs are about three-quarters deflated. Once you have the correct position and sight picture, take a deep breath, (this should drop your sight picture below the point of aim) then exhale with an audible sigh until the tip of the foresight rises to the exact point of aim. At this point you must stop breathing momentarily, focus your eye on the foresight and fire the shot by squeezing, not jerking the trigger.

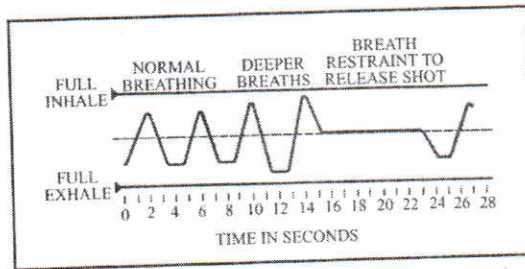


Figure 2-5-2 Breath Restraint

5. Trigger Control. The difference between good and poor shooting depends on your ability to manipulate the trigger correctly. Poor shooting often results from jerking the trigger, flinching and unnecessary body movement. If the trigger is pressed with a firm steady squeeze, each shot fired should come as a surprise to you. If it does, you will not flinch. The correct method of operating the trigger is:

- a. grasp the pistol grip firmly, forefinger on the trigger, with the trigger midway on the first joint of your finger. Squeeze the trigger straight to the rear applying equal pressure with the thumb and the trigger finger to avoid side pressure which pulls the rifle off aim. Only the trigger finger should move while the rest of the hand remains firmly in position;
- b. release the trigger completely before attempting another shot;
- c. if you hold the aim too long, the muscles will get tired and begin to tremble. If this occurs, release the trigger, relax for a moment and start again; and
- d. never fire a shot when your rifle is waying back and forth. This will have you sniping the target and will not afford you a

reliable grouping, nor will it provide you with a specific point which could be used for subsequent shots; and

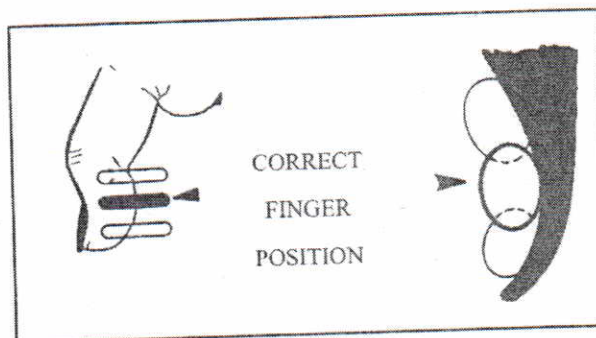


Figure 2-5-3 Trigger Control

6. Follow-through. You must maintain your aim during and after pressing the trigger. Follow-through consists of maintaining trigger pressure and keeping your sight picture on the point of aim momentarily after the shot has been fired. If you are holding your rifle correctly, the tip of the foresight will automatically return to the point of aim after firing. If it does not, you must realign your rifle before firing the next shot, follow-through was poor.

#### AIMING OFF

7. Aiming off for elevation and direction. Errors in hits on target, due to incorrect elevation and direction, can be overcome by changing the point of aim (POA) an equal and opposite amount from the original point of aim (see example below.) When conducting a zeroing practice, it is important to remember that the MPI on the target will be 150mm higher when fired from 100m, than it would be when fired from 300m.



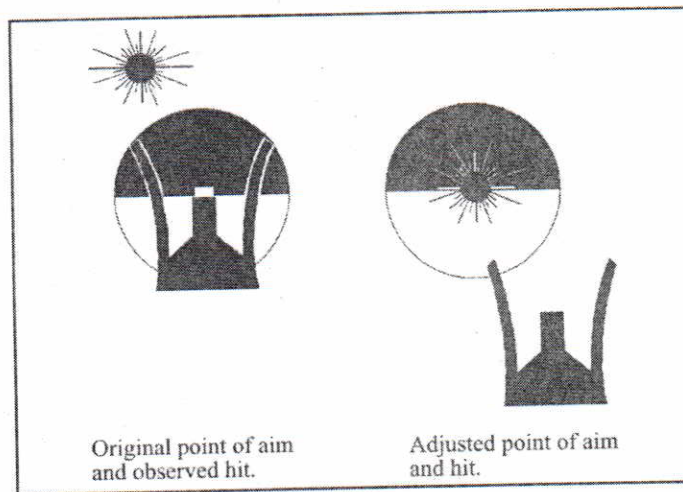


Figure 2-5-4 Aiming Off For Elevation and Direction

8. Aiming off or wind. Wind blowing across the flight path of a bullet will have the effect of causing the bullet to veer considerably to the left or right in the same direction as the wind is blowing. To counteract this effect, you must aim off into the direction of the wind ensuring an accurate strike on target. The direction of the wind can be determined by its effect on the face, trees, dust, smoke, etc. To determine the relative strength of the wind, watch for the following:

- a. a fresh wind has an appreciable effect on bushes and thin branches of trees and can be distinctly felt on the side of the face, causing range flags to stand out halfway from the pole; and
- b. a strong wind has a noticeable effect on tree tops and lifts dust off dry ground; range flags would tend to strain away from their poles.



9. In windy conditions at ranges greater than 100 metres, the following points of aim, should be used:

- a. in a fresh wind at 200 m, the point of aim is halfway between the centre and edge of the target;
- b. in a strong wind at 200 m, the point of aim is the edge of the target;
- c. in a fresh wind at 300 m, the point of aim is the edge of target; and
- d. in a strong wind at 300 m, the point of aim is one target width from the centre of the target.

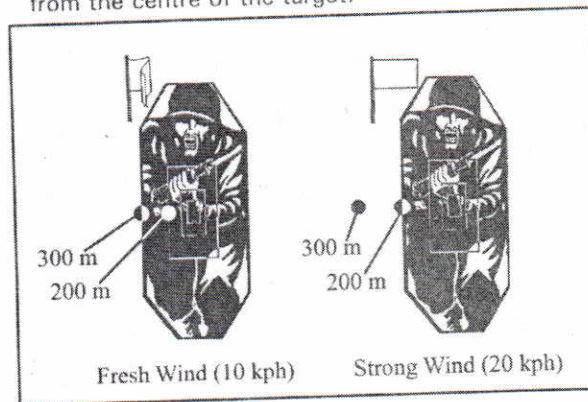


Figure 2-5-5 Aiming Off For Wind - Wind Blowing From Left To Right

### MISS DRILL

10. If you miss a target repeatedly, do the following:
  - a. aim at the left edge of the target if you think you are missing to the right and aim at the right edge of the target if you think you are missing to the left;
  - b. if you still miss, aim and fire at the base of the target and adjust the point of aim from where the bullet strikes the ground; and
  - c. continue firing using the adjusted point of aim.

### MOVING TARGETS

11. When a shot is fired at a moving target, the target will continue to move during the flight time of the bullet, resulting in the bullet striking behind the target. To compensate for this movement, it is necessary to aim in front of a moving target. This is referred to as "LEADING THE TARGET".

12. The amount of lead necessary will depend on the speed, range and direction of movement of the target. A running man will require more lead than a man walking. A target moving obliquely across the front will require less lead than a directly crossing target. A target moving head on or directly away from you will require no lead at all. At increased ranges, the lead must be changed correspondingly to compensate for the bullets longer time of flight. As a guide, try this rule of thumb: If more of the front or rear of the target is seen than the side, AIM ON. If more of the side than the front or rear of the target is seen, AIM OFF.

13. Moving targets are engaged by firing when the correct lead or point of aim relevant to the target has been taken. The two methods of engaging moving targets are:

a. the basic method:

- (1) adopt an aim behind the target;
- (2) swing through the target to the leading edge;
- (3) without checking the swing, open fire and if necessary increase the lead while firing a series of shots; and
- (4) continue firing until the target is hit or goes to ground;

b. the ambush method. This method is used when it is difficult to swing with the target. In this case, proceed as follows:

- (1) select a point of aim ahead of the target;
- (2) adopt the correct aim;
- (3) commence firing prior to the target reaching the selected point of aim; and
- (4) continue firing until the target is hit, goes to ground or the selected point of aim falls behind the target.

**FIRING POSITIONS**



Figure 2-5-6 Prone Position



Figure 2-5-7 Kneeling Position





Figure 2-5-8 Sitting Position

#### **SLINGS**

14. The standard issue sling is attached to the rifle as outlined in the following drawing.



Figure 2-5-9 Standard Sling

15. A modified sling may be used, if you are going to be on OP duty, sentry duty, or working at a vehicle checkpoint. The sling can be fastened to the rifle using field expedient fasteners such as para cord, grenade pin rings, or other suitable material.

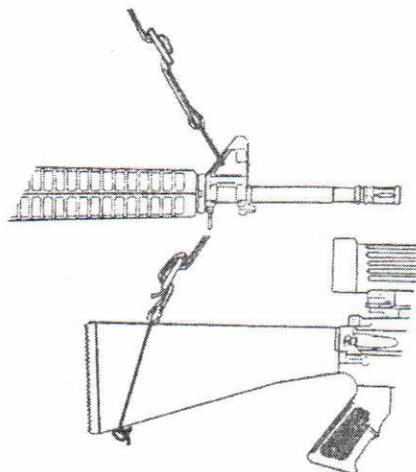


Figure 2-5-10 Modified Sling



## THE CRADLE CARRY

16. While no single method of carrying the rifle tactically can fit every circumstance, the "Cradle Carry" should be the only method used to hold or carry the C7 rifle for all eventualities except when you are in a specific fire position.



Figure 2-5-11 Cradle Carry

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2-5-14

## C7 HANDLING TESTS

### SAFETY PRECAUTIONS

1. The rifle will be loaded, lying on the floor, selector lever at "R". You will be shown a "down range" safe area. On the word of command - "**PICK UP THE RIFLE**" without further direction, you must carry out the following:

a.	pick up the rifle and point it in a safe direction;
b.	pull the cocking handle to the rear;
c.	inspect the chamber to ensure that it is clear;
d.	allow the action to go forward under control; and
e.	fire the action and close the ejection port cover.

### STRIPPING, CLEANING, ASSEMBLY

2. You will be provided with a complete cleaning kit. You must ensure the rifle is unloaded. On the order "**STRIP THE RIFLE FOR REGULAR CLEANING**", without further direction you must:

a.	carry out safety precautions, but do not operate trigger;
b.	ensure selector lever is set at "S";
c.	withdraw take down pin and pivot upper receiver down to open position;
d.	remove bolt carrier group and replace cocking handle;
e.	remove retaining pin from bolt carrier and slide out the firing pin;

f.	remove the cam pin; and
g.	remove the bolt. DO NOT STRIP THE BOLT.
h.	assembly is the reverse of stripping. Order "ASSEMBLE THE RIFLE".

#### FUNCTION TEST

3. The function test is carried out as follows:

a.	cock rifle, set selector lever to "S", squeeze trigger, (rifle should not fire);
b.	set selector lever to "R", squeeze trigger and hold, (rifle should fire);
c.	cock action while trigger is held, and then release trigger, (while releasing the hammer it should be felt/heard to fall slightly and be caught by the trigger sear);
d.	squeeze trigger again and release, (action should fire);
e.	set selector lever to "A";
f.	cock rifle, (sear should hold the hammer);
g.	squeeze trigger and hold, (action should fire);
h.	cock action while holding trigger, (as bolt carrier moves fully forward, hammer should fall and strike firing pin);
i.	release trigger and set selector to "R"; and
j.	close ejection port cover.

#### MAGAZINE FILLING

4. On the command "GO" you must fill the magazine by hand with 30 loose rounds in 70 seconds or less.

Ensure the back of the magazine is facing away from the body, fill the magazine round by round making sure the base of each round is against the rear wall of the magazine.

#### LOADING - STANDING POSITION

5. You will stand at ease with the rifle. You are timed from the command "LOAD" until you have completed the test. Pouches must be fastened on completion of the test, but are not included in the time limit. This test must be completed in 12 seconds or less:

"LOAD"	
a.	adopt the standing load position, finger outside the trigger guard;
b.	unfasten mag pouch;
c.	check that top rounds are seated properly;
d.	push it firmly into the magazine housing;
e.	make certain magazine is secure in housing;
f.	secure ammunition pouch. (Not timed)



**IMMEDIATE ACTION**

6. Your rifle is loaded. On the order **"DOWN"**, you must adopt the prone position. Simple fire orders are given. When targets are engaged testing begins.

<b>"RIFLE FIRING ALRIGHT - RIFLE STOPS!"</b>
a. cant rifle and examine bolt position;
<b>"BOLT IS FULLY TO THE REAR!"</b>
b. check for empty mag and change mags;
c. operate bolt catch;
d. push forward assist;
e. re-aim and continue firing;
<b>"RIFLE FIRES ALRIGHT - RIFLE STOPS!"</b>
f. cant rifle and examine bolt position;
<b>"BOLT IS FULLY FORWARD!"</b>
g. physically check mag is fully home and locked in place;
h. cock and look for ejection;
i. push the forward assist;
j. re-aim and carry on firing;
<b>"RIFLE FIRES ALRIGHT - RIFLE STOPS!"</b>
k. examine position of bolt;
<b>"BOLT CARRIER IS PARTIALLY FORWARD!"</b>



l.	cock the action and engage the bolt catch;
m.	examine body and chamber;
<b>"YOU SEE AN OBSTRUCTION IN THE BODY"</b>	
n.	remove magazine;
o.	clear the obstruction;
<b>"OBSTRUCTION CLEAR"</b>	
p.	replace mag and operate bolt catch;
q.	push the forward assist, re-aim and continue firing;

**UNLOADING - PRONE POSITION**

7. Time is taken from command being given until action is finished, but does not include recovery of round and closing of pouches. This test must be completed in 15 seconds or less. On the word of command **"UNLOAD"**, without further direction you must:

"UNLOAD"
a. move selector lever to "S";
b. unfasten mag pouch;
c. remove magazine;
d. place it in the pouch;
e. tilt rifle to the right and point muzzle upwards;
f. pull cocking handle to the rear and release;
g. pull cocking handle to the rear and hold;
h. tilt rifle to the right and ensure chamber is empty;
i. let cocking handle go forward;
j. set selector lever to "R" and squeeze trigger;
k. close ejection port cover; and
l. recover ejected round, clean and replace it in the magazine, return mag to pouch, and fasten pouch. (Stop time now. 15 seconds or less)

### APPLICATION OF FIRE

8. You will be asked to indicate (using the map pin) five different points of aim using the battle sight:

a.	strong wind left to right, target distance 300 m;
b.	stationary or head on target, distance 300 m;
c.	stationary or head on target, distance 100 m;
d.	strong wind right to left, target distance 300 m; and
e.	moving target left to right, brisk running pace at 200 m.

### PREPARATION FOR FIRING

9. You will be instructed to clean your rifle in preparation for firing. Without further instruction you will carry out the following actions:

a.	field strip the rifle;
b.	clean the bore removing excess lubricant;
c.	clean the face of the bolt removing excess lubricant;
d.	clean the chamber removing excess lubricant;
e.	reassemble the rifle; and
f.	carry out the function test.

**"IF THE SHOT FIRED IS NOT TIMELY AND TRUE; YOU  
HAVE NOT DONE ALL YOU WERE MEANT TO."**

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## CHAPTER 3

### LIGHT MACHINE GUN 5.56 mm C9 (LMG)

#### SECTION 1

#### CHARACTERISTICS, TECHNICAL DATA AND SAFETY PRECAUTIONS

##### CHARACTERISTICS

1. The 5.56 mm C9 LMG is a belt and magazine fed, gas operated weapon, capable of a sustained high volume of fire in bursts. It is simple in construction and easy to operate. Stoppages are rare and easily remedied. Characteristics of the C9 LMG are as follows:

- a. air cooled;
- b. two serialized barrels issued with each weapon, non-interchangeable with or useable on other weapons (they incorporate the specific headspacing and timing to match only the weapon for which they were issued). The barrels are chromed internally to reduce wear;
- c. belts of disintegrating links, factory filled, and packed in 200 round belt boxes, belted in a four ball to one trace ratio;
- d. a maximum effective range of 600 m;
- e. folding and locking bipod legs;
- f. removeable trigger guard for arctic operations;

**TECHNICAL DATA**

2. The technical data for the C9 LMG is as follows:

- a. Calibre. 5.56 X 45 mm NATO.
- b. Weight:
  - (1) LMG - 7.12 kg;
  - (2) barrel - 1.57 kg;
  - (3) loaded - 10.28 kg with 200 rd belt box; and
  - (4) loaded - 7.61 kg with C7 magazine.
- c. Length:
  - (1) LMG - 1.04 m;
  - (2) barrel - 0.53 m; and
  - (3) sight radius - 0.50 m.
- d. Muzzle velocity: 920 m/s.
- e. Cyclic rates of fire:
  - (1) normal - 700 rpm; and
  - (2) adverse - 1000 rpm.
- f. Gas regulator. 2 positions.
- g. Mode of fire. Automatic.
- h. Operation. Gas operated, air cooled, belt or magazine fed.



- i. Sight adjustment. 200 to 800 m at increments of 100 m with C79 Sight (See Chapter 2, C7 5.56 mm Rifle, Para 16, Optical Sight).
- j. Maximum effective range. 600 m.

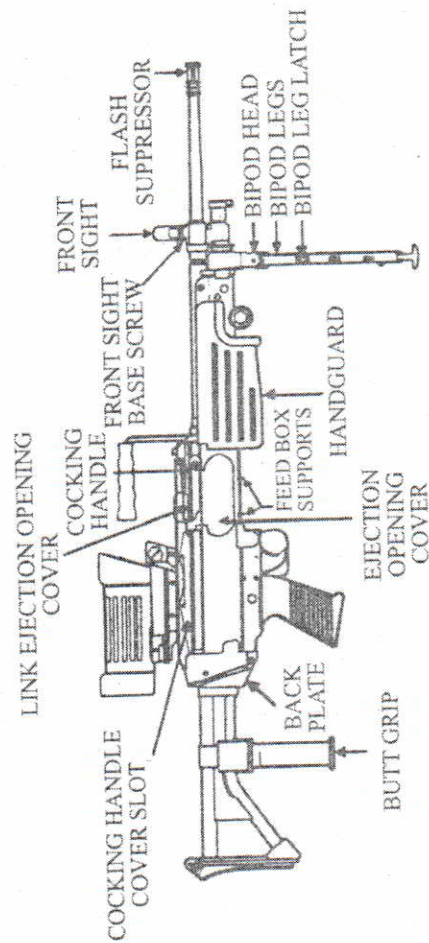


Figure 3-1-1 C9 Light Machine Gun - View From Right

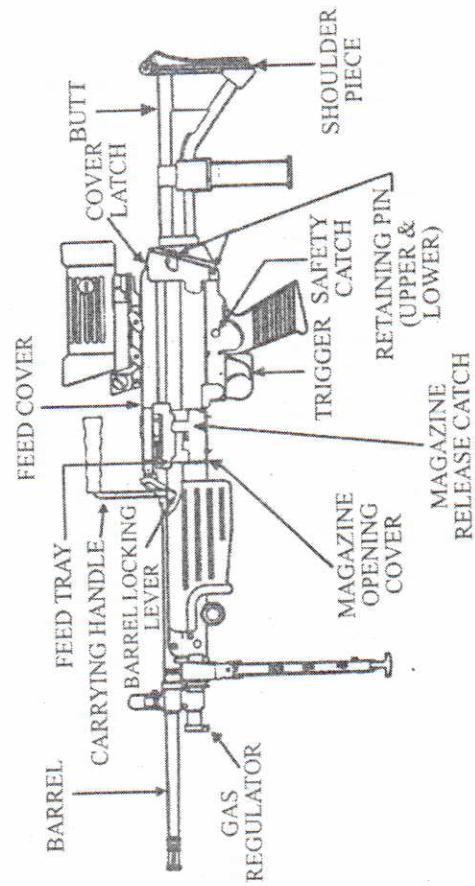


Figure 3-1-2 C9 Light Machine Gun - View From Left

3. Safety features include:
  - a. a manual safety;
  - b. operating safety with open breech (risk of cook off is eliminated);
  - c. bolt face encloses the base of the cartridge; and
  - d. the firing pin's inability to reach the primer until the bolt is fully locked.

#### THEORY OF MACHINE GUN FIRE

4. The following definitions apply to machine gun fire:
  - a. Cone of fire. When a burst is fired, the gun, as well as variations in ammunition and atmospheric conditions give each bullet a slightly different trajectory. As the burst strikes a vertical target the projectile forms an oval shaped pattern with the density decreasing toward the edges.

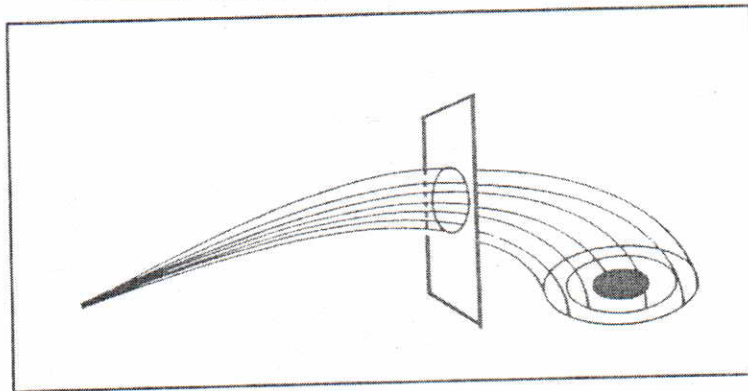


Figure 3-1-3 Cone of Fire

- b. Mean point of impact. This is the centre of the area where the most bullets hit the target.

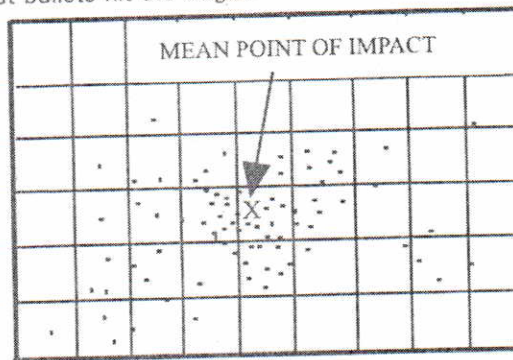


Figure 3-1-4 Mean Point of Impact

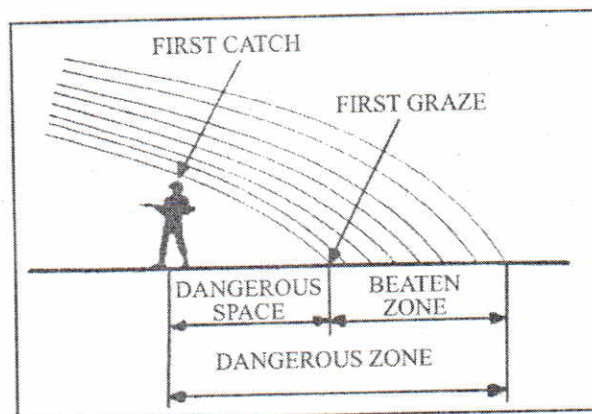


Figure 3-1-5 Dangerous Space

- c. Dangerous space. The area between the point where a bullet will just strike the top of a target (first catch) and the point

where the same bullet would strike the ground if it were allowed to continue on its trajectory (first graze).

- d. Beaten zone. The area of ground covered by the cone of fire. It is oval in shape and its density decreases outwards.
- e. Dangerous zone. The area covered by the dangerous space and the beaten zone. For fire to be effective, the target must be within the dangerous zone.

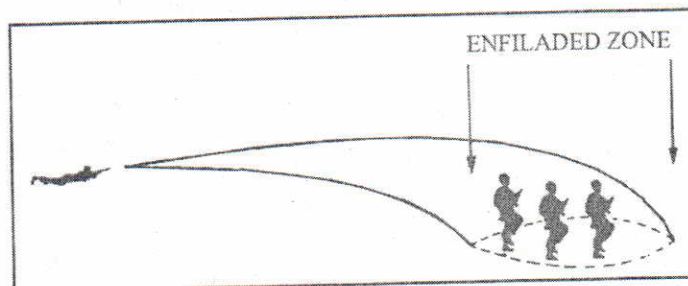


Figure 3-1-6 Beaten Zone

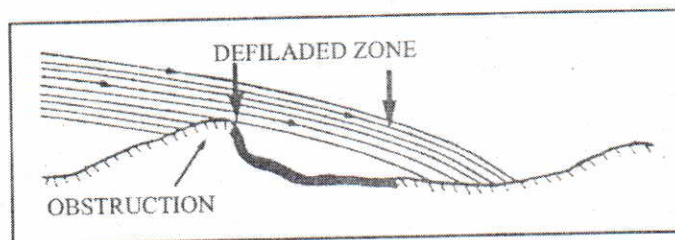


Figure 3-1-7 Dangerous Zone

#### EFFECTS OF THE GROUND

5. The physical nature of the ground affects the size of the beaten zone as follows:



- a. a steep hill side will limit the spread of the beaten zone;
- b. a gentle facing slope will produce a beaten zone slightly larger than on a steep hill side;
- c. on level ground the beaten zone will achieve it's optimum spread and density;
- d. on a reverse slope the beaten zone will be spread over a larger area as the cone of fire arcs over the back side of a hill;
- e. a defilade zone is an area of ground that would be included in the beaten zone if it were not for an obstruction stopping the lower bullets in the cone of fire; and
- f. an enfilade zone is an area of ground in which a group of targets in line are included in the length of the beaten zone.

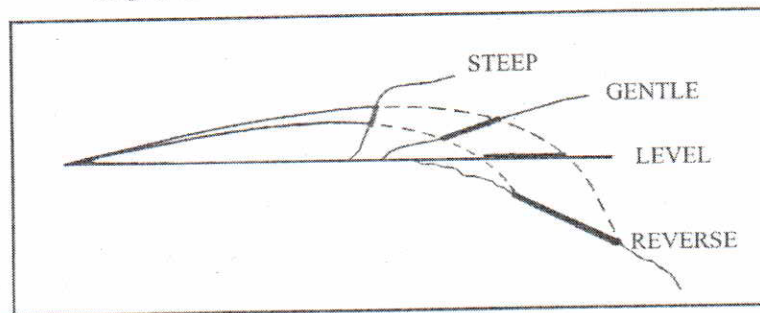


Figure 3-1-8 Effect of Ground on the Beaten Zone

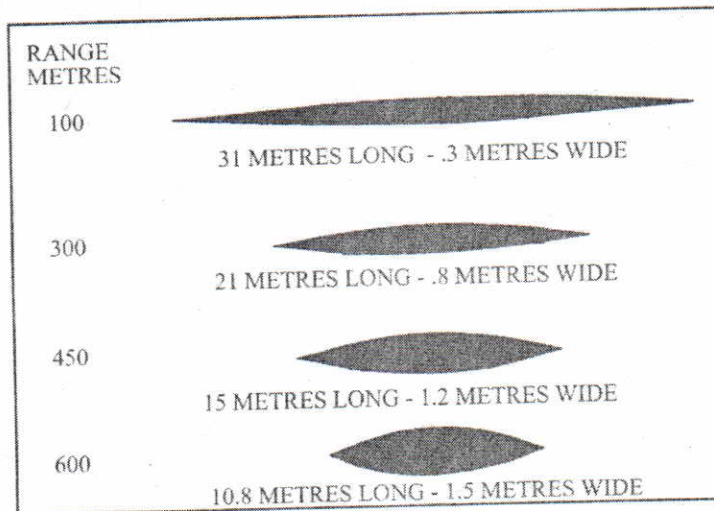


Figure 3-1-9 Beaten Zone Size

#### SAFETY PRECAUTIONS

6. Safety precautions ensure that the weapon is clear of ammunition. Safety precautions will be carried out on the following occasions:

- a. before and after instruction,
- b. before stripping,
- c. during issue from and return to stores,
- d. before and after range practices,
- e. whenever anyone picks-up or is handed a weapon, and

- f. when in doubt.
- 7. On the order **"FOR INSPECTION CLEAR WEAPON"**:
  - a. open the feed cover by pushing on the cover latches;
  - b. cock the action by grasping the cocking handle in an overhand grip, pulling it fully to the rear and returning the cocking handle to the locked position;
  - c. lift the feed tray; and
  - d. inspect the chamber and receiver to ensure that they are clear. At night check your chamber and receiver with your fingers.
- 8. On the order **"CLEAR"**:
  - a. lower the feed tray and close the feed cover;
  - b. pull the cocking handle to the rear, squeeze the trigger and allow the working parts to go forward under control; and
  - c. close the ejection port cover.

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## SECTION 2

## STRIPPING, ASSEMBLING AND CLEANING

## FIELD STRIPPING

1. To field strip and assemble the C9 LMG carry out the following:
  - a. recoil mechanism:
    - (1) carry out safety precautions;
    - (2) lay parts left to right;
    - (3) pull the upper retaining pin to the left and pivot the butt down under control;
    - (4) push forward and upward on the return spring rod assembly to free it from the receiver groove;
    - (5) remove the return spring rod assembly and separate;
    - (6) open the feed cover and pull the cocking handle to the rear;
    - (7) slide the moving parts out of the weapon and push the cocking handle fully forward;
    - (8) rotate the bolt counter-clockwise to disengage the lug and separate it from the bolt carrier. When the bolt is removed, the firing pin spring is free. DO NOT LOSE IT; and
    - (9) separate the bolt carrier from the piston by pressing the retaining pin to the left.

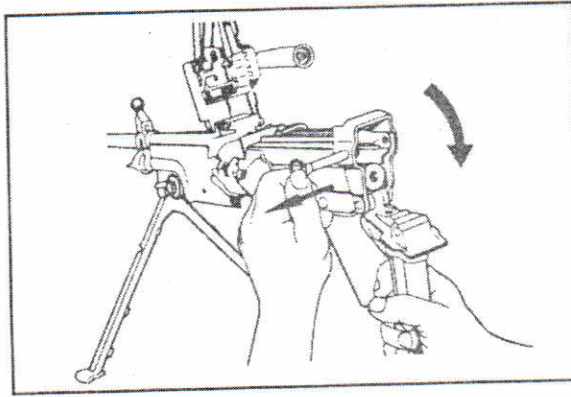


Figure 3-2-1 Butt Pivot

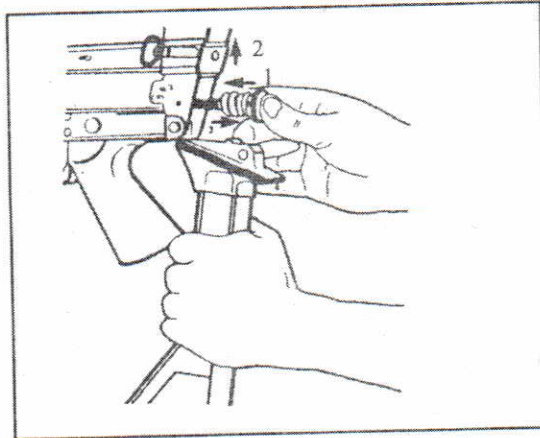


Figure 3-2-2 Freeing Return Spring Rod Assembly

b. barrel:

- (1) pull the locking lever backward with the left hand; and



- (2) grab the carrying handle with the right hand and lift the barrel forward out of the receiver; and

c. gas regulator:

- (1) position the gas regulator between normal and adverse; and
- (2) place the tip of the return spring rod in the notch in the top of the gas block (normal position of the lever) and turn the regulator beyond normal under control until the gas regulator lever can be removed from the gas block.

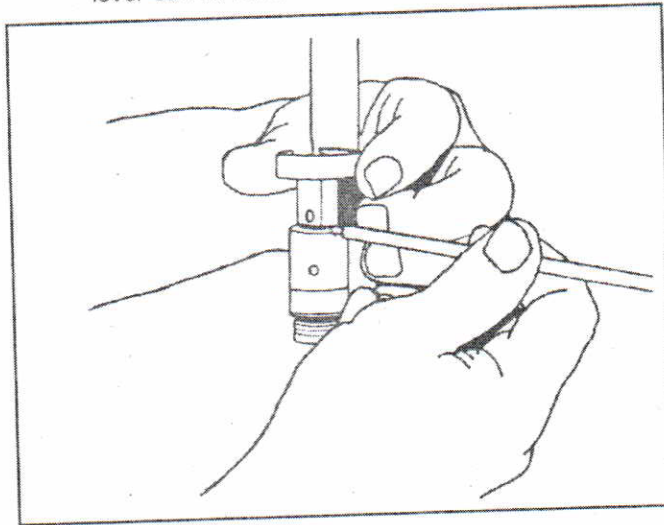


Figure 3-2-3 Gas Block

d. handguard:

- (1) push the retaining pin to the left using the return spring rod; and

- (2) pull the hand guard to the rear and down.

#### DETAILED STRIPPING

2. This level of stripping is conducted for weekly cleaning and after firing. This level of stripping is a sequence conducted over and above field stripping. Once field stripping is complete, carry out the following:

- a. remove the sling and optical sight;
- b. rotate the gas cylinder to release the locking spring located at the rear of the cylinder;
- c. pull the gas cylinder forward out of the receiver;
- d. pull the bipod forward and remove;
- e. butt:
  - (1) push the lower retaining pin to the left and withdraw the butt rearward from the receiver; and
  - (2) remove the butt from the receiver; and
- f. pull the trigger group assembly to the rear and off the receiver.

#### WARNING

You must never strip the weapon further than for detailed stripping.

#### ASSEMBLING

3. Regardless of the level of stripping conducted, assembly of the weapon is always completed in the reverse order to stripping. Before mounting the barrel on the weapon, ensure that there are no

obstructions in it and that the number 1 barrel with the correct (matching) serial number is being mounted.

**NOTE**

Ensure the trigger group is re-assembled on the receiver before the bolt and piston cylinder are placed back on the weapon. Perform the function test upon assembly.

**FUNCTION TEST**

4. To ensure that the weapon will operate properly, a function test must be carried out after assembly. The following is the procedure for the function test:

- a. cock the weapon and move the safety catch to SAFE;
- b. squeeze the trigger to confirm the action is held to the rear;
- c. move the safety catch to FIRE;
- d. pull the cocking handle to the rear;
- e. squeeze the trigger allowing the action to go forward under control; and
- f. close the ejection port cover.

**CLEANING**

5. You must be able to handle and maintain the C9 LMG with the confidence and efficiency that ensures it is kept in a ready to fire state at all times. This ensures that the weapon will operate with virtually no

stoppages.

6. Daily Cleaning. Daily cleaning is conducted to keep the weapon rust free, in good working condition and to remove dirt and fouling. The following points apply to the use of CLP during cleaning:

- a. to be used sparingly for all temperatures and conditions;
  - b. to be used in very limited amounts, as it may cause stoppages;
  - c. no other oil, solvent or lubricant is to be used; and
  - d. CLP should be shaken vigorously prior to use to ensure an even distribution of teflon. When mixed correctly, the solution will have a milky appearance.
7. The following procedures are followed during daily cleaning:
- a. Clean the chamber using the chamber brush and the cleaning rod.
  - b. The barrel brush is used to remove heavy fouling from the barrel. Use the same procedure that is carried out for the C7 rifle.
  - c. Use the swab holder and a swab 25 X 25 mm, and pull the barrel through from the chamber to the muzzle.
  - d. Lubricate the barrel using a swab 25 X 25 mm.
  - e. Clean and lubricate the flash suppressor with CLP.
  - f. Clean the gas cylinder using the rod and chamber brush with a piece of clean rag approximately 100 mm by 150 mm wrapped around the brush. On completion inspect and lubricate the cylinder using a piece of rag 100 mm x 100 mm inserted in the swab holder.

- g. Clean the remainder of the weapon with a brush and CLP.
  - h. Assemble the weapon and carry out the function test.
  - i. Clean, check, and repack all cleaning tools.
8. Cleaning before firing. Cleaning before firing, is conducted to ensure the weapon is properly lubricated, all parts are secure and it is functioning properly. Once the weapon clean and all parts are dry:
- a. assemble the weapon, and at the same time, lubricate the bearing surfaces of the bolt and piston extension, guide ribs, feed arm, feed channel, the return spring, and the trigger mechanism. Ensure that the safety catch is set to "FIRE" before inserting the working parts into the gun;
  - b. ensure that the barrel is one of the two matched to the weapon, set the gas regulator to normal, ensure that it has no obstructions, and then lock it firmly into position;
  - c. check the sights for tightness, particularly the front sight locking screw; and
  - d. when the gun is assembled, squeeze the trigger and move the working parts backwards and forwards several times to ensure an even lubrication of the working parts.
9. To prevent stoppages, the following parts must be free of CLP:
- a. barrel and chamber,
  - b. gas regulator,
  - c. piston head,
  - d. internal parts of the gas cylinder, and

e. bolt face.

10. Extreme cold conditions. Under arctic conditions, CLP is used sparingly to prevent sluggish performance resulting from the lubricant freezing. Prior to firing, the trigger guard must be removed to enable you to operate the trigger when wearing thick gloves or arctic mitts. Also the following should be done if time and the tactical situation permits:

- a. Unload and cock the working parts two or three times every 30 minutes.
- b. Do not lay a warm weapon directly in the snow or ice.
- c. Whenever possible, leave the weapon in a protected, cold area outside.
- d. When moving from a warm to cold area, keep the weapon covered to prevent condensation and freezing.
- e. When moving from a cold to a warm area, the weapon should be stripped and wiped dry several times as it reaches room temperature.
- f. If possible, the LMG should be cleaned in a warm area with the weapon at room temperature.

11. Cleaning during firing. Every opportunity must be taken to clean, examine and lubricate this weapon during lulls in firing. Special attention should be given to the chamber and gas affected parts. A toothbrush and a 1" paintbrush are very useful tools to have for this task.

12. Cleaning after firing. After firing, strip the weapon and clean it only using the tools and equipment provided. The weapon is easier to clean immediately after firing while it is still warm. Should cleaning after firing not be possible, apply CLP to all parts affected by gas to aid



in dissolving carbon fouling for later cleaning. Cleaning after firing is carried out as follows:

a. barrel:

- (1) attach the bore cleaning brush to the cleaning rod, lubricate the brush, and clean out the barrel, working from both the chamber end and muzzle end. Ensure the barrel brush passes through the entire length of the barrel. Repeat as required;
- (2) dry clean the barrel using a swab;
- (3) inspect the barrel, and repeat the above steps if necessary; and
- (4) apply CLP to the bore;

b. gas regulator:

- (1) the gas regulator is cleaned using the scraper tool, carried in the hand guard; and
- (2) clean the gas escape holes, central hole and grooves. The regulator body may be heavily fouled and will normally require thorough cleaning;

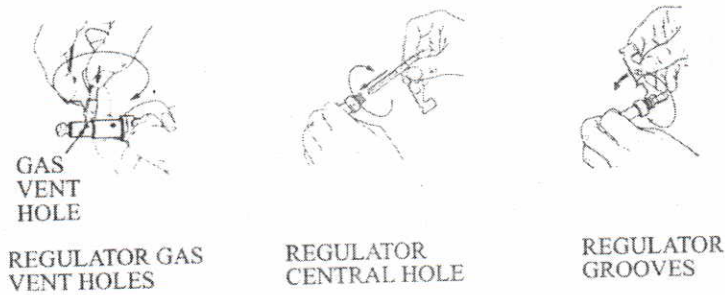


Figure 3-2-4 Gas Regulator Cleaning

c. piston group:

- (1) the hole in the front of the piston is cleaned with the scraper tool in the same manner used for cleaning the front hole of the gas cylinder; and
- (2) clean the piston head grooves by clamping the scraper tool around the piston head, and rotating it;

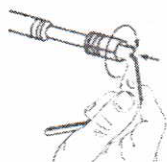
d. body group:

- (1) with the scraper tool, clean the cannellure and gas escape at the front of the cylinder;
- (2) insert the scraper into the cylinder, apply pressure to the handle and rotate the tool until all foreign matter has been removed;
- (3) clean the gas cylinder with a lubricated brush fitted to the cleaning rod. Dry the gas cylinder with a piece of swab wrapped around the brush; and

- (4) clean the rest of the body, especially the guide grooves and the feed mechanism. Lubricate all parts and assemble the weapon.

#### NOTE

The bore, chamber, piston and other gas affected parts must be thoroughly cleaned, inspected, and lubricated once a day, for a minimum of three days after the weapon has been fired.



PISTON FRONT



PISTON GROOVES

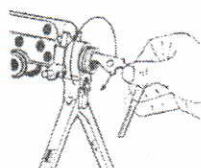
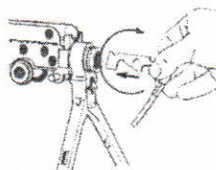
CYLINDER  
INTERNAL GROOVESCYLINDER  
INSIDE FRONT

Figure 3-2-5 Gas Cylinder Cleaning

#### AMMUNITION

12. The 5.56 mm ammunition for this weapon is issued, at a ratio of four ball to one trace, in ammunition boxes and also in belts of 200 rounds. The belts are of metal disintegrating link type and can be

readily broken or joined to produce belts of any length:

a. belted ammunition:

- (1) To separate a belt, hold the rounds on each side of the point at which the belt is to be separated and twist them in opposite directions. The links will disengage at that point. Alternately, remove one round by forcing it out backward, therewith disengaging it from the links.
- (2) To join two belts, fit the projection of the end link to the notch of the other, making sure that the links are facing up. If there is a round in position, press the projection so that it snaps into place over the cartridge case. If no round is in position, insert one.

b. ammunition belt box and magazine filling:

- (1) When it is necessary to load belted ammunition in the boxes, remove the lid from the box, feed the belt into the box, ensuring the rounds are pointing away from you, links up, with the box feed opening facing right. Feed the first round out through the opening in the box and clip it into the plastic clip. Replace the box lid.
- (2) Under some circumstances the C7 rifle magazine is also used with the C9 LMG.

### SECTION 3

#### HANDLING DRILLS

##### LOAD

1. On the order "LOAD":
  - a. adopt the prone position behind the weapon;
  - b. grasp the butt grip with the left hand;
  - c. grasp the pistol grip with the right hand, index finger outside the trigger guard and tilt the weapon to the right;
  - d. place the 200 round belt box on the weapon;
  - e. open the feed cover;
  - f. pull 20 rounds straight out of the belt box and remove the plastic clip by twisting it;
  - g. ensure that the ammunition and links are not damaged;
  - h. position the belt on the feed tray, links uppermost, first round against the cartridge stop;
  - i. hold the belt in position with the left hand and close the feed cover with the right; and
  - j. return your hands to the correct position on the butt grip and pistol grip, and the weapon to the upright position.

**UNLOAD**

2. On the order "**UNLOAD**":
  - a. raise the butt into the shoulder and cock the weapon;
  - b. lower the butt, raise the feed cover and remove the belt;
  - c. clear the feed tray;
  - d. close the feed cover;
  - e. raise the butt into the shoulder;
  - f. align the sights on the target and squeeze the trigger;
  - g. remove the belt box;
  - h. lower the butt and close the ejection port cover; and
  - i. set the sights to the battle sight setting and lower the shoulder piece.

**READY OR RANGE**

3. The weapon will not be in a condition to fire until you carry out actions pursuant to the order "**READY**" or a specific range being ordered, because the bolt is still in it's forward position. On the order "**READY**":

- a. set the optical sight to the range ordered;
- b. raise the shoulder piece;
- c. lift the butt into the shoulder and cock the weapon. Ensure that the cocking handle is pushed fully forward;



- d. move the safety catch to "SAFE" and close the ejection port cover;
  - e. grasp the pistol grip with the right hand, place the index finger along the trigger guard; and
  - f. grasp the butt grip with the left hand.
4. Make Safe. The actions pursuant to the order "MAKE SAFE" converts a ready to fire weapon to one that has the bolt forward with ammunition on the feed tray. On the order "MAKE SAFE":

- a. unload; and
- b. load.

5. Clear Gun. On the order "UNLOAD - CLEAR GUN" carry out the following:

- a. unload;
- b. remove the belt box;
- c. raise the feed cover;
- d. lower the shoulder piece; and
- e. stand up and report "Gun Clear".

#### LOAD AND UNLOAD WITH A MAGAZINE

6. Following the order "LOAD":
- a. tilt the weapon to the right, pick up a magazine and check that the rounds are seated correctly;

- b. insert the magazine into the magazine housing, ensuring that it is locked in place; and
- c. return your hands to the correct positions on both the butt grip and pistol grip, and ensure the weapon is in the upright position.

#### UNLOAD

- 7. Following the order "UNLOAD":
  - a. raise the butt into the shoulder and cock the weapon;
  - b. lower the butt and remove the magazine;
  - c. raise the butt into the shoulder;
  - d. align the sights on the target and squeeze the trigger; and
  - e. lower the butt and close the ejection port cover.

#### IMMEDIATE ACTIONS AND STOPPAGES

8. If this weapon is properly cleaned and correctly prepared for firing, stoppages will seldom occur; however, should the weapon stop firing it is imperative that you know how to remedy the stoppage immediately.

9. Immediate Actions. Following is the immediate action, which is the instinctive, corrective and quick action performed when the weapon fails to fire:

- a. cock the weapon;
- b. lower the butt;
- c. open the feed cover, clear the feed tray by sweeping the feed tray with the hand and close the feed cover;

- d. raise the butt into the shoulder, align the sights on the target and squeeze the trigger. If a round has remained in the chamber it may be fired; and
  - e. lower the butt, reload, raise the butt into the shoulder and cock the weapon, realign on the target and continue firing.
10. Stoppages. The following are possible stoppages that will be cleared with the immediate action. To remember the types of stoppages remember the acronym "HELMDD":
- a. Hard extraction,
  - b. Expended belt or empty magazine,
  - c. Live round partly fed, due to damaged link,
  - d. Misfired round,
  - e. Damaged rounds, and
  - f. Damaged link.
11. Subsequent Actions to IA's. If the IA fails to clear the stoppage, subsequent actions must be taken to return the weapon to a firing condition as follows:
- a. The weapon cannot be fully cocked. If on attempting to carry out the IA the cocking handle cannot be pulled fully to the rear, a damaged link may be jamming the feed pawls, therefore carry out following:
    - (1) hold the cocking handle as far back as possible and lower the butt;
    - (2) open the feed cover, clear the feed tray and close the feed cover; and

- (3) raise the butt, complete the cocking action, squeeze the trigger, lower the butt, reload, raise the butt, cock the weapon, realign onto the target, and continue firing.
- b. If after completing the IA, the weapon fires a few rounds and stops again, carry out the gas stoppage drill as follows:
  - (1) cock the weapon;
  - (2) move the safety catch to SAFE;
  - (3) lower the butt;
  - (4) adjust for more gas by rotating the regulator to ADVERSE;
  - (5) raise the butt into the shoulder. Move the safety catch to FIRE and continue firing; and
  - (6) if the stoppage persists change barrels and at the earliest opportunity, clean the gas plug and block using the issued reamers.
- c. If on attempting to carry out the IA the weapon cannot be cocked, a live round may be jammed in the chamber; presenting a stoppage with the action closed. If this stoppage occurs during a range practice, clearing the weapon will be done under the supervision of the Range Safety Officer who will clear the firing point of all non-essential personnel. Without delay notify the range control staff after lowering the butt and ensuring that the weapon remains pointed down range. Under the supervision of the Range Safety Officer, the following will be carried out:
  - (1) open the feed cover, clear the feed tray, and close the feed cover;
  - (2) use a mechanical assist such as a sling to cock the weapon. The cocking handle must be controlled to prevent an

accidental discharge. (Assistance will be required to hold the weapon); and

- (3) when the weapon is cocked ensure the working parts are fully to the rear. Raise the feed cover and examine the chamber.

**CAUTION**

Extreme caution must be exercised when a live round is jammed in the chamber, as it may cook-off or be fired mechanically during attempts to clear it.

12. Other Stoppages. Although stoppages caused by broken parts or obstructions are rare, you must be able to quickly recognize and remedy these stoppages. When this is the case, carry out the following:

- a. unload, but do not close the ejection opening cover or lower the butt;
- b. cock the weapon again, lower the butt, open the feed cover, raise the feed tray, and inspect the interior of the receiver; and
- c. depending on what you see in the receiver, one of the following will be carried out:
  - (1) obstruction in the body,
  - (2) empty casing in the chamber,
  - (3) obstruction in the barrel or separated case,
  - (4) damaged or broken parts, or

- (5) feed pawl and springs.

#### OBSTRUCTION

13. Obstruction in the body. If you see an obstruction in the receiver such as a jammed live round or empty casing, remove it by hand, or if necessary, use a tool from the cleaning kit. Once the obstruction is clear inspect the chamber. Whether the chamber is clear or has a live round seated in it the drill will be as follows:

- a. close the feed cover;
- b. raise the butt into the shoulder;
- c. correctly aim the weapon and squeeze the trigger (the round may fire);
- d. ensure the working parts are forward and lower the butt;
- e. reload;
- f. raise the butt;
- g. cock the weapon; and
- h. aim and carry on firing.

14. Empty case in the chamber. If on initial inspection or after removing the obstruction from the receiver you see an empty case in the chamber:

- a. close the feed cover;
- b. raise the butt into the shoulder, correctly aim the weapon and squeeze the trigger;
- c. strip the weapon and inspect the extractor. If broken, it must be repaired by a weapons technician; and



- d. if the extractor is not broken, clear the empty casing and continue firing.

15. Obstruction in the barrel or separated casing. If no obstruction is detected in the body and chamber, remove the barrel and inspect it for an obstruction, or a separated casing. If there is an obstruction, including a separated casing, change barrels, raise the butt into the shoulder, allow the working parts to go forward, lower the butt, reload, raise the butt, cock the weapon, correctly aim the weapon and continue firing. The obstructed barrel must not be used until it has been certified by a weapons technician. Care must be taken to ensure that the specified rates of fire and bursts are strictly adhered to, when firing with only one barrel.

#### DAMAGED OR BROKEN PARTS

16. If, after completing the IA and stoppage drill, the weapon will not fire, the following actions must be carried out:

- a. unload and strip the weapon; and
- b. examine the weapon and ejected ammunition for signs indicating damaged or broken parts as follows:
  - (1) primer not struck (broken firing pin),
  - (2) primer not properly struck (weak return spring), and
  - (3) repeated failure to eject (broken ejector).

#### FEED PAWL AND SPRINGS

17. After completing the IA, if the weapon will not fire and you cannot cock it fully, open the feed cover and examine the feed pawls and springs. If the feed pawls are not working freely:

- a. clean and oil the pawls;

- b. close the feed cover; and
- c. load and carry on firing.

#### RUNAWAY GUN

18. A malfunction may cause the weapon to fire after the trigger has been released. If this happens:

- a. maintain a firm grip on the weapon;
- b. twist the belt at the point of entry into the feedway, thereby breaking the belt or jamming the feed; and
- c. when the weapon stops firing, clear it, inspect it for faults, reload, set the gas regulator to "ADVERSE", raise the butt, cock, and carry on firing.

## SECTION 4

### HOLDING, AIMING AND FIRING

#### HOLDING AND AIMING

1. Once a range is ordered carry out the following drill:
  - a. correctly aim the weapon;
  - b. when a target is indicated, use the left hand to move the butt grip as necessary to line it up with the body and target. Open your legs and ensure your heels are flat on the ground;
  - c. slight adjustments for height can be made by moving the elbows inwards or outwards;
  - d. if a large adjustment is required, move the safety catch to SAFE, lower the butt and adjust the height of the bipod legs;
  - e. move the body up to the weapon until the right shoulder is firmly in contact with the butt;
  - f. grasp the butt grip with the left hand and pull the butt backward and downward. Place the left elbow in line with the right elbow so that the shoulders remain square to the front;
  - g. hold the pistol grip firmly with the right hand, place your index finger on the trigger and pull the weapon into the shoulder;
  - h. lock your wrists to maintain a firm grip on the weapon; and
  - i. test your hold on the weapon by rocking back and forth slightly. The foresight should move directly up and down on the point of aim.

## FIRE POSITIONS

2. The requirements of a good fire position are:
  - a. allows free use of personal weapons;
  - b. provides cover from indirect and small arms fire;
  - c. affords cover from view;
  - d. provides an unobstructed view of a wide arc of fire; and
  - e. has no dead ground close to the positions.
3. In addition to the above, there are special considerations for light machine gun fire positions as follows.
  - a. Only minimum exposure is required to fire around cover.
  - b. Care must be taken to keep the ejection port opening clear.
  - c. On sloping ground the weapon can be kept upright by rotating it in the bipod sleeve and adjusting the bipod legs.
  - d. Ensure that the muzzle clears any obstacle or crest between you and your target.
  - e. When it is necessary to fold the bipod to make the best use of cover, the weapon should be rested on the swivel point of the bipod.

## FIRING

4. Since the C9 LMG fires up to 750 rounds per minute, you must economize your fire. The drills for, "STOP" and "GO ON" will ensure that ammunition is not wasted. On the order "FIRE", once your hold and aim are correct you must ensure that:

- a. the trigger is squeezed only long enough to fire a burst of three to five rounds and then fully released;
- b. your observation of the fall of shot from any burst is most important. The moment the trigger is released, open both eyes and observe the area of the target to ascertain the impact of the rounds;
- c. make any necessary adjustments to the sights or point of aim, then continue firing;
- d. on the order "STOP":
  - (1) cock the weapon; and
  - (2) move the safety catch to SAFE with the left hand, then lower the butt;
- e. on the order "GO ON":
  - (1) realign the weapon on the target; and
  - (2) move the safety catch to FIRE and continue firing;
- f. on the order "STOP-MAKE SAFE", cock the weapon, move the safety catch to SAFE, lower the butt and carry out the unload and load drills.

## RATES OF FIRE AND BURST LENGTHS

5. The rate of fire relates to the number of rounds fired per minute. A burst is the number of rounds fired from the time the trigger is squeezed until it is released. The following are the terms used to describe the rates of fire:

- a. Normal rate. Fifty rounds per minute fired in short bursts. A short burst of three to five rounds is necessary to observe the impact and to correct errors in range and azimuth. Tracer rounds are used to assist in the observation of the rounds fired.
- b. Rapid rate of fire. 100 rounds per minute fired in long bursts of 8 to 10 rounds per minute. The longer burst length increases the size of the beaten zone which should envelop the target. Targets which may be engaged with a rapid rate of fire are:
  - (1) enemy troops engaged in a mass assault,
  - (2) ambushes,
  - (3) as covering fire, and
  - (4) turrets of armoured fighting vehicles and artillery weapons with exposed crews.

## MOVING TARGETS

6. When shooting at moving targets select a point of aim well in front of the target. Maintain that point of aim and fire a long burst just prior to the target entering the beaten zone.

## BARREL CHANGE

7. The normal rate of fire will not overheat the barrel, but extended use of the rapid rate and continuously firing long bursts will. You must use common sense to regulate the rate of fire and length of



burst, remembering that overheating wears out the barrel. Consider the following when firing the LMG C9:

- a. Do not fire more than 200 rounds in a sustained rate of fire with the same barrel. This is done to avoid overheating and consequent dangerous stoppages.
- b. To change the barrel:
  - (1) unload but do not lower the butt or close the ejection port cover;
  - (2) cock the weapon and lower the butt;
  - (3) remove the barrel;
  - (4) select the other barrel for that weapon, check it for obstructions, ensure that the gas regulator is set at normal and then mount the barrel on the weapon; and

allow the working parts to go forward, reload, cock the weapon, raise the butt into the shoulder and carry on firing.

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## C9 HANDLING TESTS

### SAFETY PRECAUTIONS

1. The weapon is unloaded and either in the corner of a room or on a firing point. You are ordered to bring the weapon to the centre of the room or to another firing point. You must carry out the safety precaution without error. Without further direction you will perform the following:

a.	open the feed cover;
b.	cock the action with an overhand grasp, and return the cocking handle to the locked position;
c.	lift the feed tray;
d.	inspect the chamber and receiver to ensure that they are clear;
e.	lower the feed tray and close the feed cover;
f.	allow the action to go forward under control; and
g.	close the ejection opening cover.

### STRIPPING, CLEANING, AND ASSEMBLING

2. You will be allowed a maximum of three mistakes. On the command **"STRIP THE WEAPON FOR DAILY CLEANING!"** you will carry out the following:

a.	carry out the safety precautions;
b.	pull the upper retaining pin to the left, lowering the butt;
c.	remove the return spring rod assembly;
d.	separate the return spring from the rod;
e.	open the feed cover and pull the cocking handle to the rear;
f.	remove the moving parts;
g.	push the cocking handle fully forward;
h.	separate the bolt from the bolt carrier;
i.	separate bolt carrier from the piston;
j.	remove the barrel;
k.	remove the gas regulator;
l.	remove the gas plug;
m.	remove the handguard;
ASSEMBLE IN REVERSE ORDER TO STRIPPING, ENSURING THAT THE SERIAL NUMBER ON THE BARREL MATCHES THE WEAPON. CARRY OUT THE FUNCTION TEST-	

n.	cock the weapon and move the safety catch to SAFE;
o.	squeeze the trigger to confirm the action is held to the rear; and
p.	move the safety catch to FIRE, pull the cocking handle to the rear, squeeze the trigger, allow the action to go forward under control. Close the ejection opening cover.

#### LOADING

3. Adopt the load position with the belt box on the ground to the left of the weapon. You must complete this test in 12 seconds or less. Time is taken from the order "LOAD" until you have your hands back in the proper positions and the gun is upright:

a.	tilt the weapon to the right;
b.	place the belt box on the weapon;
c.	open the feed cover;
d.	pull out the ammunition;
e.	check the belt for damaged links;
f.	position the belt on the feed tray, links up;
g.	holding the belt in place with the left hand, close the feed cover with the right; and
h.	return the hands to the proper positions, weapon upright.

#### IMMEDIATE ACTION AND GAS STOPPAGE

4. You must complete this test or 10 seconds or less. After a brief fire control order, you will be given the order "GUN STOPS":

a.	cock the action;
b.	lower the butt;
c.	open the feed cover;
d.	clear the feed tray;
e.	close the feed cover;
f.	raise the butt;
g.	aim and fire;
h.	lower the butt;
i.	reload;
j.	raise the butt and cock the action; and
k.	aim and continue firing.



## UNLOADING

5. You must complete this test in 12 seconds or less. Time is taken from the order "UNLOAD", until you have set the optical sight to the battle sight setting. The test is to be done as follows:

"STOP"
a. cock the action;
b. move the safety catch to SAFE with the left hand;
c. lower the butt;
"UNLOAD!"
d. raise the butt and cock the action;
e. lower the butt and raise the feed cover;
f. remove the belt and clear the feed tray;
g. close the feed cover;
h. raise the butt, aim and fire;
i. remove the belt box;
j. lower the butt;
l. close the ejection opening cover; and
m. set the optical sight at the battle sight setting.

**PREPARE FOR FIRING**

6. You will be ordered to prepare the weapon for firing. You are allowed a maximum of 5 mistakes. You must carry out the following:

a. field strip the weapon;
b. perform regular cleaning and leave dry;
<b>LUBRICATE THE FOLLOWING PARTS</b>
c. bearing surfaces of the bolt and piston extension;
d. locking lever and locking shoulder;
e. guide ribs;
f. feed arm and feed channel;
g. return spring;
h. trigger mechanism;
<b>UPON COMPLETING THE ABOVE, ASSEMBLE THE WEAPON</b>
i. ensure that the barrel is one of the two matched to the weapon;
j. set the gas regulator to normal setting and check the barrel for obstructions; and
k. when the weapon is assembled, squeeze the trigger and move the working parts back and forth under control several times.

## CHAPTER 4

## SHORT RANGE ANTIARMOUR WEAPON (LIGHT) (SRAAW(L))

## SECTION 1

CHARACTERISTICS, TECHNICAL DATA AND  
SAFETY PRECAUTIONS

## CHARACTERISTICS

1. The M72-C7 is the Canadian model of the US M72. It is a light weight antiarmour weapon that has a high degree of safety, ruggedness, accuracy and reliability. The following characteristics apply to the M72-C7:

- a. light weight and compact;
- b. operated by one person and can be fired from any of the conventional firing positions;
- c. pre-loaded and fires a single shot from a disposable launcher tube;
- d. maximum effective range of 150 m;
- e. capable of penetrating 274 mm of armour at zero degrees deflection; and
- f. a back-blast danger area of 175 m.

## TECHNICAL DATA

2. The launcher consists of two telescoping tubes. The inner tube is oriented to the outer tube by a channel assembly which rides in an alignment slot in the trigger housing assembly. The inner tube is constructed of aluminum. It extends telescopically along the channel

assembly which houses the firing pin rod assembly and locks the launcher in the extended position through the detent lever assembly. The firing pin rod assembly locks under the trigger assembly and cocks the weapon upon extension. Other pertinent data is as follows:

- a. Length :
  - (1) when extended for firing - 89.3 cm,
  - (2) length in collapsed mode - 65.4 cm.
- b. Weight - 2.3 kg.
- c. Firing mechanism - percussion.
- d. C7 sight:
  - (1) front - includes a battle sight for night firing and a reticle sight graduated from 50 to 350 m; and
  - (2) rear - a battle sight aperture is closed with a removable polyethylene plug. The sight has settings for  $+^{\circ}\text{C}$  or  $-^{\circ}\text{C}$  propellant temperatures.
- e. Rocket data:
  - (1) length - 50.8 cm;
  - (2) weight - 1.0 kg;
  - (3) muzzle velocity - 145 m/sec at  $21^{\circ}\text{C}$ ; and
  - (4) maximum effective range - 150 m.

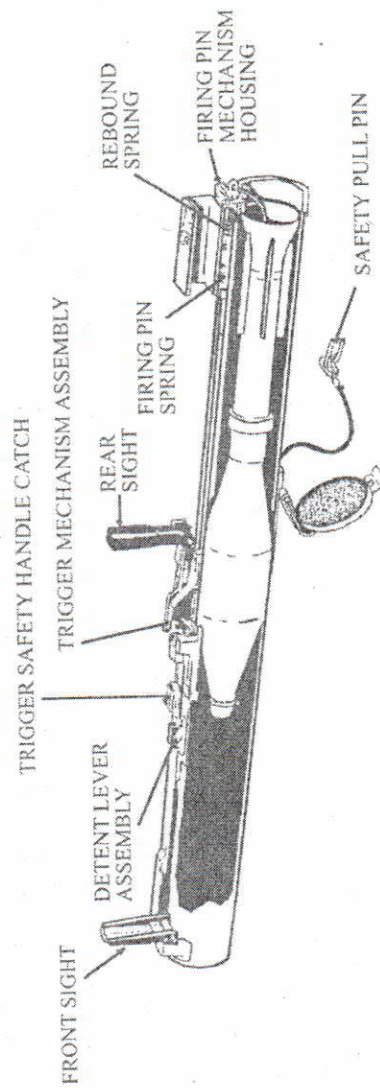


Figure 4-1-1 SRAAW(L) - Cut Away  
4-1-3

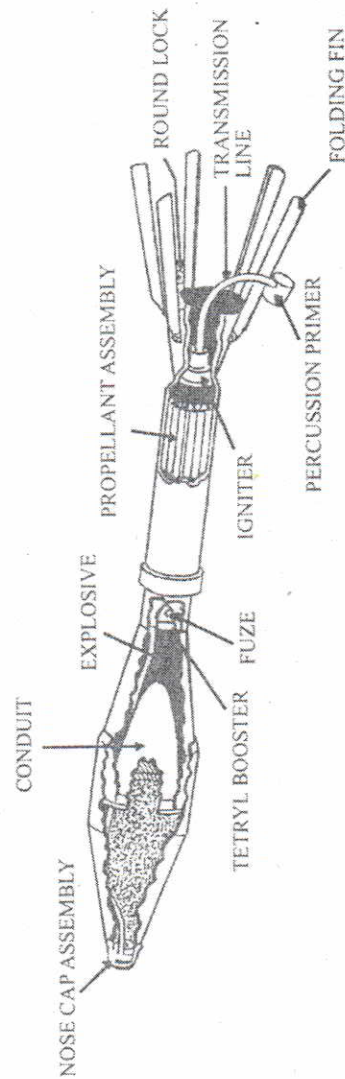


Figure 4-1-2 SRAAW(L) - Rocket  
4-1-4



**SAFETY PRECAUTIONS**

3. THE M72 IS PRELOADED AND IS POTENTIALLY DANGEROUS AT BOTH ENDS. All launchers must be treated as a live weapon until proven otherwise. When the weapon is issued, the user will ensure that:

- a. front and rear covers are securely in place;
- b. trigger safety handle is in the safe position; and
- c. pull pin is correctly positioned.

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## SECTION 2

### FIRING POSITIONS AND DRILLS

#### PREPARATION FOR FIRING

1. To prepare the launcher for firing, the following steps must be taken:
  - a. ensure that the safety catch is on "SAFE";
  - b. remove the pull pin;
  - c. rotate the rear cover downward;
  - d. remove the front cover and sling assembly;
  - e. extend the launcher by sharply pulling the hands away from each other until the launcher locks in the extended position;
  - f. attempt to collapse the launcher by reversing the motion of the hands. If the launcher does not collapse, it is fully extended;
  - g. if two attempts to lock the inner tube into position fail, do not use the weapon system. Close the weapon system and set it aside for disposal by an ammunition technician; and
  - h. keep the launcher pointed at the target and ensure that all personnel are clear of the rocket's path and back-blast area before attempting the preparation for firing procedure.

## FIRING POSITIONS

2. Standing Position. The standing position is similar to that for firing a rifle. Face the target, make a half-right turn, spread the feet a comfortable distance apart and place the launcher on the shoulder. The left hand holds the forward portion of the launcher. The right elbow is placed against the body for stability.



Figure 4-2-1 Standing Position

3. Sitting Position. In this position the firer will face the target, make a half-right turn, sit with legs crossed, lean slightly forward from

the hips and rest the elbows forward of the knees to avoid bone-to-bone contact.



Figure 4-2-2 Sitting Position

4. Kneeling Position (alternate). This position is preferable for tracking moving targets. To assume the kneeling position, face the target, make a half-right turn and kneel on the right knee. Point the left leg toward the target with the left foot at a right angle to and opposite the right knee. The left leg forms a right angle to the ground. Hold the body erect with the left elbow under the launcher and the right elbow against the side.





Figure 4-2-3 Kneeling Position

5. Prone Position. To assume the prone position, lie at an angle of not less than 800 mils (45 degrees) to the line of fire in order to keep clear of the back blast area. The back should be straight and the right leg directly on a line running through the right hip and right shoulder. Move the left leg as far as possible to the left without feeling discomfort. Keep both heels on the ground. Hold the head as steady as possible with the right eye lined up with the sights. If tracking a moving target is required, maintain an 800 mil angle, between launcher and body, so that the back blast is not directed at the feet and legs.





Figure 4-2-4 Prone Position

6. The M72-C7 may be fired from the shoulder in the standing, kneeling, sitting or prone positions. The exact position held may vary slightly to allow for the size of an individual's body. However, you must ensure that the position is stable and comfortable and that it is the most suitable one for engaging the target.

## SIGHTS

7. Rear Sight. The rear sight is basically a peepsight. Sight through the aperture by placing the eye in line with the peephole and focus on the target while looking through the front sight reticle. The rear sight on the launcher has a larger aperture at the top which is used in conjunction with the small luminous tip on the foresight. This is the battle sight, used at night or under conditions of poor visibility for targets of ranges up to 100 m.

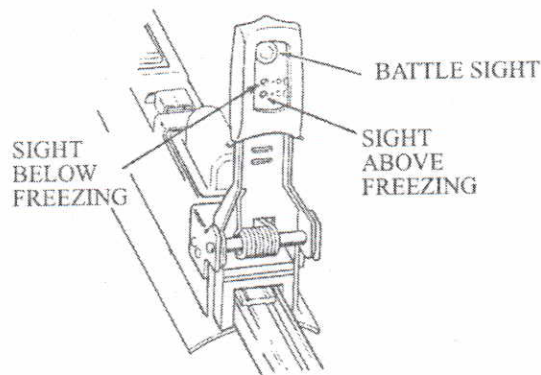


Figure 4-2-5 Rear Sight

8. Front Sight Reticle. The M72-C7 sight reticle has a vertical range line used with ranges from 50 to 350 m. Horizontal wires are positioned within the open frame at 100, 150 and 200 m ranges. Lead index marks representing 24 km/h (15 mph) target speed are used for moving targets. The vertical wire in the centre is the aiming line, used for stationary or head-on targets. The vertical lines formed by the inside edges of the cutaway frame represent the lead to hit a target moving 24km/h (15mph). Graduations on the plastic portion represent 25 metre increments and are numbered every 50 m down to 350 m. The battle sight for night firing, is painted with luminous paint.

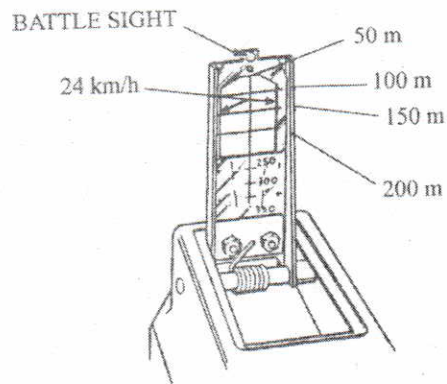
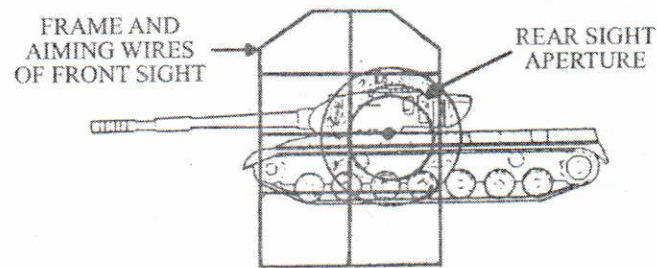


Figure 4-2-6 Front Sight

**AIMING**

9. Aiming at stationary targets and targets that are moving directly away or toward the firer is done in the following manner:

- a. Stationary Target. To engage a stationary or head-on target, estimate the range to the target. Find this range on the sight where the horizontal wire intersects the vertical wire, and place that point of intersection on the centre of the target's mass.
- b. Moving Targets. To engage moving targets, select a point along the horizontal wire, corresponding to the estimated range and apparent target crossing speed, and place it on the centre of mass. The central vertical wire must always be ahead of this point.



THE CORRECT SIGHT PICTURE FOR A TANK CROSSING RIGHT TO LEFT AT A DISTANCE OF 150 m, WITH A SPEED OF 12km/h.

Figure 4-2-7 Aiming

10. The user can engage the moving target in two ways:
  - a. aim at the selected spot on the target and move the launcher horizontally, keeping pace with the movement of the target; or
  - b. aim slightly ahead of the target and wait for the selected point on the target to coincide with the aim.

#### TRIGGER OPERATION

11. The trigger safety handle must be pulled forward in the direction of the front sight to the release or ARM position before the trigger can be depressed. This safety device is not released until the launcher is in the correct firing position on the user's shoulder. To fire, pressure is applied straight down onto the trigger bar.

**DRILLS**

12. Firing Drill. The launcher may be fired from the right or left shoulder. The steps to be followed are:

- a. prepare the weapon for firing;
- b. check that the back-blast area is clear;
- c. place the launcher on the shoulder;
- d. pull the trigger safety handle forward to the "ARM" position;
- e. aim the launcher and using the finger tips only, depress the trigger bar; and
- f. observe the strike and note any correction that may be required for subsequent fire.

13. Misfire. A misfire may be due to a faulty firing mechanism or a faulty element in the propellant charge explosive train. It should be considered as a possible delayed firing until that possibility has been eliminated.

14. Hangfire. A hangfire is a delay in the functioning of the propellant charge explosive train at the time of firing. The amount of delay is unpredictable and can fall within the range of a split second to several minutes; therefore, a hangfire cannot be immediately distinguished from a misfire.

15. Misfire Drill. The misfire drill incorporates the immediate action drill and is carried out in the following manner:

- a. maintain the aim for 10 seconds;
- b. ensure that the trigger safety handle is in the "ARM" position;



- c. check the back-blast area;
- d. squeeze the trigger again;
- e. if the weapon does not fire, maintain the aim for 60 seconds;
- f. attempt to return the trigger safety handle to the "SAFE" position;
- g. remove the launcher from the shoulder;
- h. depress the detent and collapse the launcher approximately 4 inches;
- i. grasp the rear sight cover and re-extend the launcher;
- j. check the back-blast area;
- k. place the launcher on the shoulder;
- l. pull the safety handle to the "ARM" position;
- m. aim, then squeeze the trigger;
- n. if the weapon still does not fire, keep the weapon trained on the target area for at least one minute;
- o. attempt to return the trigger safety handle to the "SAFE" position;
- p. remove it from the shoulder without collapsing it and carry it to a flank (at least 50 m from personnel) for disposal. Ensure that the weapon is pointed down range and that the back-blast area is clear while carrying the weapon; and
- q. call for an ammunition technician to investigate the cause of the defect.



# SRAAW(L) HANDLING TESTS

## PREPARE FOR FIRING CHECK

SER	SKILL TO BE PERFORMED
	On the command "PREPARE THE SRAAW (L) FOR FIRING" the operator must:
1	With the feet in the firing position, turn the upper body so that the weapon is pointed down range. Ensure the back-blast area is clear;
2	remove the pull pin;
3	rotate the rear cover downward;
4	disengage cover and sling;
5	grasp the launcher rear sight cover with the firing hand and the forward portion of the outer tube with the non-firing hand;
6	sharply pull the hands away from each other until the launcher locks into the open position;
7	to ensure that the launcher is fully extended, try to collapse the launcher by reversing the motion of the hands pushing them toward each other;
8	check the back-blast area;
9	place the launcher on the shoulder in the correct firing position;
10	move the trigger safety handle to the "ARM" position;
11	aim the launcher; and
12	on the word of command "FIRE", depress the trigger.

MISFIRE DRILL

SER	SKILL TO BE PERFORMED
	On the command "MISFIRE" the operator must:
1	maintain the aim for 10 seconds;
2	ensure the trigger safety handle is in the "ARM" position;
3	attempt to fire again. If the launcher does not fire, carry out the remainder of the MISFIRE drill as follows:
	a. maintain the aim for one minute;
	b. attempt to return the trigger safety handle to the "SAFE" position;
	c. take the launcher from the shoulder keeping it aimed down range and ensure the back-blast area is clear;
	d. depress the detent and collapse the launcher approximately 10 cms;
	e. re-extend the launcher and ensure it is locked;
	f. check the back-blast area;
	g. place the launcher on the shoulder;
	h. pull the safety handle to the "ARM" position; and
	i. aim and attempt to fire;
4	if the launcher again fails to fire, keep it trained on the target for one minute;
5	attempt to return the trigger safety handle to the "SAFE" position; and

6	do not collapse the launcher. Take it from the shoulder and carry it to a flank (50 m) misfire pit for disposal. Ensure that the launcher remains pointed down range and that the back-blast area remains clear.
---	--

**MAKE SAFE DRILL**

SER	SKILL TO BE PERFORMED
	On the command "CEASE FIRE, MAKE SAFE" the operator must:
1	return the trigger safety handle to "SAFE";
2	take the launcher from the shoulder;
3	depress the barrel detent and collapse the launcher;
4	guide the front and rear sights into position; and
5	replace the sling assembly.

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## CHAPTER 5

### SHORT RANGE ANTIARMOUR WEAPON (MEDIUM) (SRAAW(M))

#### SECTION 1

#### CHARACTERISTICS, TECHNICAL DATA AND SAFETY PRECAUTIONS

##### CHARACTERISTICS

1. To effectively employ the gun, you must know the following characteristics:

a. Range:

- (1) maximum effective range with standard ammunition is 400 m against stationary and 300 m against moving targets;
- (2) maximum effective range with Rocket Assisted Projectile (RAP) is 700 m; and
- (3) primarily used against AFVs but is also very effective against gun emplacements, strong points and houses.

b. Weight:

- (1) complete with ancillaries, gun board and cover, it weighs 30.16kg; and
- (2) the gun is fitted with a telescopic sight unit and mount, which weighs 16 kg.

c. Sights:

- (1) telescopic sight;

- (2) open sights, can be fitted with luminous, phosphorous attachments; and
- (3) night vision sights.

d. Ammunition:

- (1) HEAT-T High Explosive Anti-Tank Tracer;
- (2) TPT - Target Practice Tracer;
- (3) RAP - Rocket Assisted Projectile; and
- (4) smoke.

e. Back blast:

- (1) 30 m back blast area and 200 m danger area, measured from the point of firing; and
- (2) 800 mil backblast angle and 533 mil danger area angle from each side of gun.

f. Muzzle velocity:

- (1) 314 m/s for conventional ammunition; and
- (2) 260 m/s for rocket assisted projectile.

g. Maximum rate of fire. 5 rpm.

**TECHNICAL DATA**

2. The pertinent data for the SRAAW(Med):

a. Barrel:

- (1) length - 1.31 metres; and



(2) twist of rifling - uniform 1 turn in 43 calibers.

b. Venturi length. 0.43 metres.

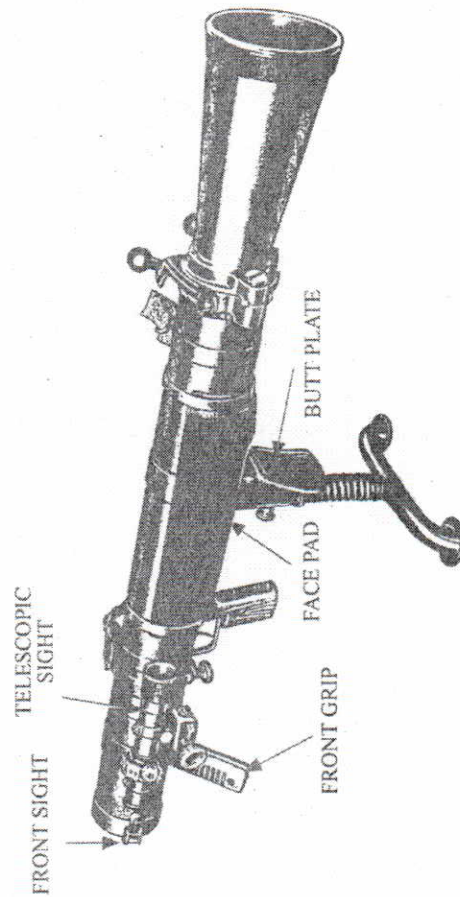


Figure 5-1-1 Carl Gustav - View From Left Rear  
5-1-3

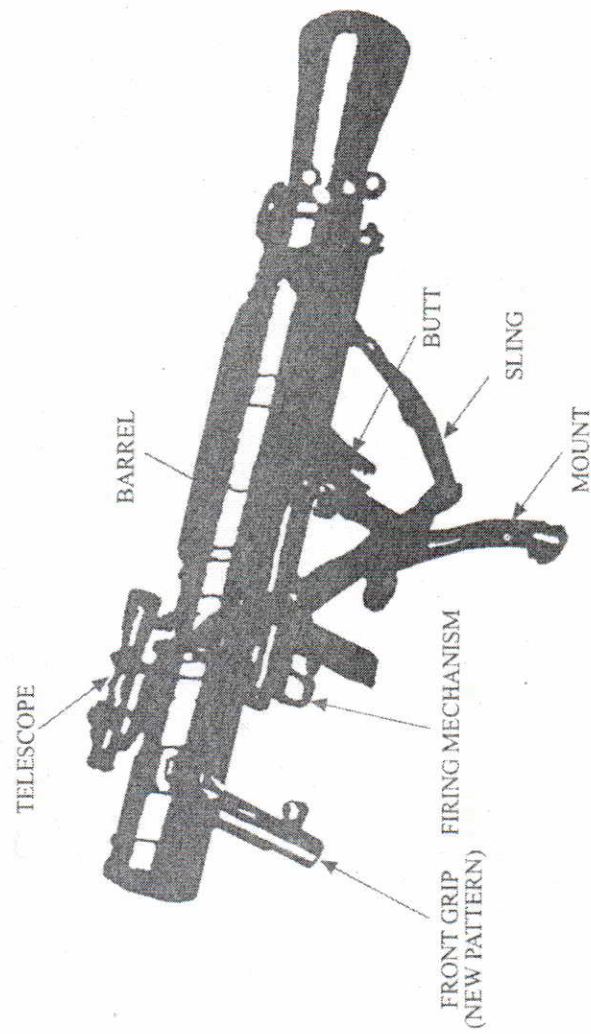


Figure 5-1-2 Carl Gustav - View From Left Front  
5-1-4

### SAFETY PRECAUTIONS

3. The SRAAW (Med) is a very powerful weapon, therefore safety precautions are vital to ensure accidents never happen. Therefore before handling the gun, always verify:

- a. the breach and barrel for any live rounds; and
- b. all ammunition to ensure it is the proper type for the conditions under which the weapon will be used.

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## SECTION 2

### FIRING POSITIONS AND DRILLS

#### FIRING POSITIONS



Figure 5-2-1 Standing and Fire Trench Positions



Figure 5-2-2 Kneeling Position





Figure 5-2-3 Prone Position

1. Regardless of the firing position, the load and unload drills remain the same. The weapon team consists of the following:
  - a. NO. 1, carries the gun, sight unit bag and 2 rounds. The telescopic sight is not normally mounted until the weapon is in a firing position. No. 1 also carries a personal weapon;
  - b. NO. 2, carries two or more rounds of ammunition plus bag No. 2 (spares and accessories) and a personal weapon; and
  - c. other soldiers in the sub-unit will carry additional rounds of anti-tank, high explosive and smoke.

**LOAD**

2. Action of No. 1. When the order "**LOAD**" is given the No. 1 shall:
  - a. mount the telescopic sight unit, fold out iron sights or fold out the iron sights and position the luminous sights if required;
  - b. push the cocking handle fully forward with the right thumb returning the right hand to the firing grip with the index finger running along the trigger guard;
  - c. put the safety catch to "S" with the left hand and return the left hand to the front grip; and
  - d. give the order "**LOAD**" to No. 2.
3. Action of No. 2. On the command "**LOAD**" the No. 2 shall:
  - a. repeat "**LOAD**";
  - b. open the breech by pushing the venturi lock knob forward with the right hand and rotating the venturi with the left hand on the venturi lever;
  - c. visually examine the breech and barrel for dirt or unburnt propellant. If the chamber is dirty it must be cleaned;
  - d. pick up the round nose forward with the right hand using an underhand grip. Remove the rubber protective cover and grasp the rim of the round with the left hand, placing one finger in the recess in the rim of the round;
  - e. insert the round into the chamber ensuring that the recess is in line with the cartridge guide;
  - f. close the breech with the left hand;

- g. tap the venturi lock knob to the rear to ensure that the lock is fully closed;
- h. check the back blast area and report "READY". No. 1 shall repeat "READY"; and
- i. prepare the next round for firing.

#### UNLOAD

- 4. Action of No. 1. When the order "unload" is given the No. 1 shall:
  - a. check that the safety catch is at "S" with the left hand then return the left hand to the front grip and with the right hand on the firing grip place the right index finger along the trigger guard;
  - b. order "UNLOAD";
  - c. on "CLEAR" from No. 2 repeat "CLEAR", put the safety catch to "F" and press the trigger; and
  - d. remove or fold the sights.
- 5. Action of No. 2. On the command "UNLOAD" the No. 2 shall:
  - a. repeat "UNLOAD";
  - b. open the breech and tap the venturi lock knob forward to partially eject the round or empty casing;
  - c. grasp the rim of the round or empty casing with the left hand and remove it from the chamber. An empty casing shall be cast aside out of the back blast area and live round shall be caught with an underhand grip of the right hand;

- d. close the breech with the left hand;
- e. tap the venturi lock knob to the rear;
- f. report "CLEAR"; and
- g. replace the rubber protective cover on the fuse of the round and replace it in it's container.

#### FIRING DRILL

6. Due to the backblast signature of this weapon you must employ it quickly and accurately to avoid immediate return fire from targets you are engaging; therefore, No. 1 and No. 2 must work as a team to achieve first round hits. In the event that this gun fails to fire due to ammunition or mechanical failures, you must know the drills to immediately return it to action. The following actions constitute the firing drills:

- a. with a loaded gun, when a target is acquired or ordered, No. 1 shall set the range, move the safety catch to "F", aim and take up the first pressure on the trigger. When satisfied that the correct aim has been achieved, No. 1 fires the gun;
- b. once the gun is fired, No. 1 observes the flight of the projectile and the strike on target, cocks the gun with the right thumb, moves the safety catch to "S" with the left hand and orders either "LOAD" or "UNLOAD". No. 1 maintains the sight picture until the load or unload is completed;
- c. a subsequent "LOAD" will be a combination of the unload and load drills. No. 2 shall:
  - (1) open the venturi, remove and throw away the empty casing; and
  - (2) leave the venturi open, pick up another round and complete loading the gun;

- d. before firing a subsequent round, No. 1 shall make sight adjustments or alterations in aim to ensure a hit;
- e. should at any time, the back blast area not be clear, the No. 2 shall order **"STOP"**; and
- f. when ordered to **"STOP"**, the No. 1 shall repeat **"STOP"**, move the safety catch to **"S"** and if necessary unload until the rear area is clear.

#### MISFIRE DRILL

- 7. If the weapon fails to fire, the following action shall be taken:
  - a. No. 1 maintains the point of aim, re-cocks with the right thumb, puts the safety catch to **"S"** with the left hand and orders No. 2 to **"CHECK VENTURI LOCK"**. No. 2 repeats **"CHECK VENTURI LOCK"**; and
  - b. No. 2 taps the venturi lock knob to the rear and reports to No. 1 **"VENTURI LOCK CHECKED"**. No. 1 repeats **"VENTURI LOCK CHECKED"**, places the safety catch to **"F"**, re-aims, and fires.
- 8. If the weapon fails to fire a second time, the following action shall be taken:
  - a. No. 1 will call **"MISFIRE"**. No. 2 repeats **"MISFIRE"**;
  - b. No. 1 and 2 wait one minute with No. 1 maintaining the sight picture in the event of a possible hang fire;
  - c. if the gun has not fired after one minute, No. 1 cocks the weapon with the right thumb, places the safety catch to **"S"** with the left hand, and orders **"MISFIRE UNLOAD"**. No. 2 repeats **"MISFIRE UNLOAD"**; and



d. after unloading the gun, one of the following drills shall be carried out:

- (1) Primer Struck. After removing the misfired round, No. 2 inspects the primer. If the primer is fully struck he reports "PRIMER STRUCK". No. 1 repeats "PRIMER STRUCK". No. 2 then lays the misfired round aside for eventual disposal, reloads automatically if the target is still in view, and reports "READY". If the target is not in view, No. 2 will report "CLEAR".
- (2) Mechanical Breakdown. If on examination of the primer, No. 2 finds it has been either lightly struck or not struck at all, he will report "MECHANICAL BREAKDOWN". No. 1 repeats "MECHANICAL BREAKDOWN". No. 2 will then close the venturi and report "CLEAR". No. 1 repeats "CLEAR" and completes the unloading drill.

NOTE

The handling drills can best be summarized as:  
COCK (the gun), LOCK (the safety to SAFE), TALK (to the Number 2).



## SECTION 3

### SIGHTS

#### GENERAL

1. The 84 mm gun has three types of sights, the open sight, the telescopic sight and the luminous night sight. The sight systems used on the current 84 mm lack a range finding capability therefore it is very important that gun crews be proficient in estimating ranges (The AN/PVS 502 Night Vision Set can also be mounted).

#### TELESCOPIC SIGHT UNIT

2. This is the primary sight unit used with the gun. It includes the following:
- a. two drums which are used with the bore sight to adjust the sight either up or down and left or right to bring the two points of aim together;
  - b. the drum located on top of the sight moves it vertically. The drum located on the side of the sight moves it horizontally;
  - c. each drum is marked with a zero point. To either side of zero the drum is graduated in mils for a total of 15 each side;
  - d. the horizontal drum is marked with the letters R and L each having an arrow pointing back to zero. When the drum is moved toward R and its arrow, the MPI will shift to the left. When the drum is rotated toward L and its arrow, the MPI will shift to the right. Remember, the MPI moves with the direction of the arrows, zero being the halfway point between R and L; and
  - e. the elevation drum is marked with a + and - symbol, each having an arrow pointing back toward zero. The direction of

graticule movement is indicated by the plus and minus symbols and their corresponding arrows. "Plus" (+) indicates a downward movement of the MPI, while minus (-) indicates an upward movement of the MPI. The scale is read against index lines which are colour coded;

- (1) **WHITE.** The centre index line terminates in a white dot. It is used to zero the scale when bore sighting at all temperatures and is the drum zero index at ammunition temperatures from  $-10^{\circ}$  to  $31^{\circ}\text{C}$ ;
  - (2) **RED.** The rear index line terminates in a red dot. It is used as the drum zero index at ammunition temperatures above  $31^{\circ}\text{C}$ ; and
  - (3) **BLUE.** The front index line terminates in a blue dot. It is used as the drum zero index at ammunition temperatures below  $-10^{\circ}\text{C}$ .
3. Optical Arrangement. The optical arrangement of the sight is such that the lenses produce a magnification of X2, and a field of view of 302 mils.
4. Graticule Pattern. The tip of the pointer in the graticule represents zero elevation and zero deflection. The lead marks to either side of the pointer represent aim off points relevant to set speeds of 16, 32, 48 kph (10, 20, 30 mph). The bracket which mounts the telescope to the gun has two attaching clamps. It is geared to a range knob which provides a means of adjusting for range.
5. Telescope Mount. The telescope mount houses the gearing for the range knob. The range knob has two sets of figures representing ranges in hundreds of meters. The outer set of figures is coloured white and is used for anti-tank applications. The inner set of figures is coloured light green and is used for high explosive and smoke applications. To select the appropriate range scale for either application, return the range knob to zero, push in or pull out as applicable and set the range.

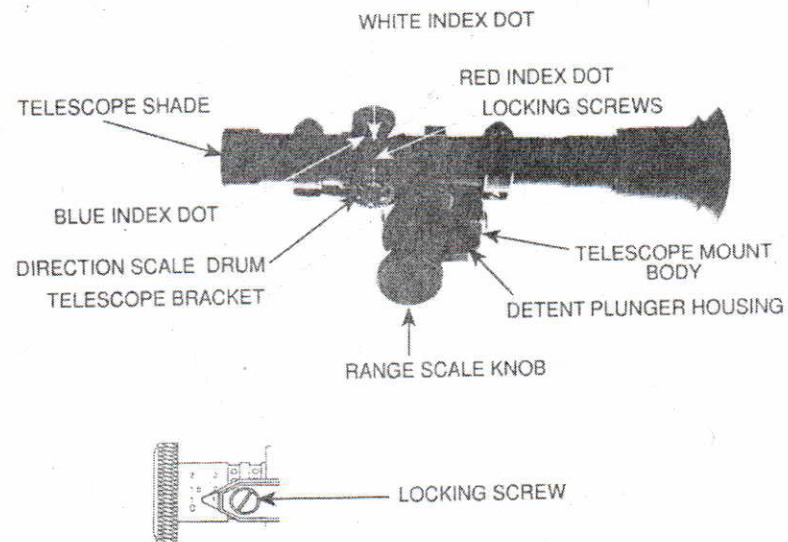


Figure 5-3-1 Carl Gustav Telescope - View From Left

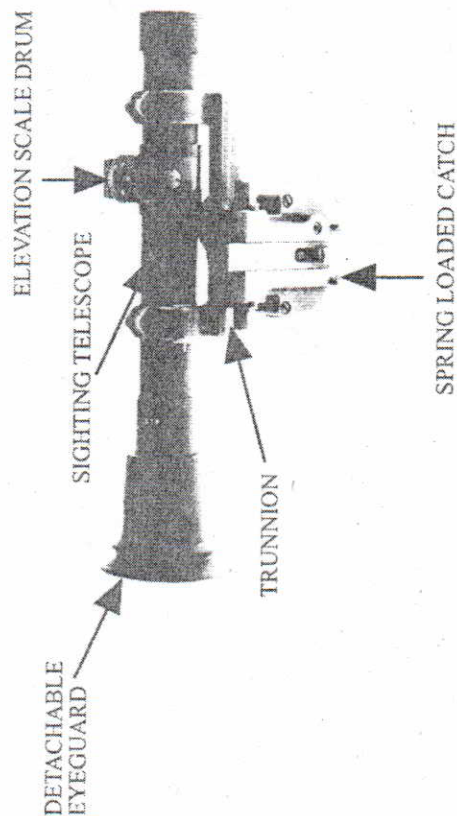


Figure 5-3-2 Carl Gustav Telescope - View From Right

#### OPEN SIGHTS

6. The gun is fitted with a backup sighting arrangement. When use of the telescopic sight is inappropriate or if it becomes damaged, the open sight can be utilized. The open sights are arranged as follows:

- a. the front sight is of a fixed blade type and is housed in a protective steel ring. It is attached to the gun with a pivot pin located near the muzzle, which allows the sight to fold out; and
- b. the rear sight has the following characteristics:
  - (1) secured to the barrel forward of the face pad;
  - (2) fitted with a pivot to allow it to fold out;
  - (3) fitted with a range scale graduated in hundreds of metres numbered from 0 to 10;
  - (4) 0 to 550 m marks are coloured **WHITE** and are for anti-tank applications;
  - (5) 600 to 1000 m marks are coloured **GREEN** and are for smoke and high explosive applications;
  - (6) as with the telescopic sight unit, the open sight can be bore-sighted according to ammunition temperatures;
    - (a) **WHITE** is the thick white line centred on the range scale and is used for bore sighting at ammunition temperatures from  $-10^{\circ}\text{C}$  to  $31^{\circ}\text{C}$ ;
    - (b) **RED** is below the white index line and indicates that the bottom edge of the white line is to be used for indexing when operating at ammunition temperatures above  $31^{\circ}\text{C}$ ; and
    - (c) **BLUE** is above the white index line and indicates that the top edge of the white line is used for indexing when operating at ammunition temperatures below  $-10^{\circ}\text{C}$ .



### LUMINOUS NIGHT SIGHTS

7. To allow night firing, the open sights can be fitted with luminous night sights:

- a. the front blade sight attachment features a series of phosphorous dots arranged in a circle with the 6 o'clock dot omitted to clarify the blade detail; and
- b. the rear sight attachment also features a series of phosphorous dots arranged in a circle.

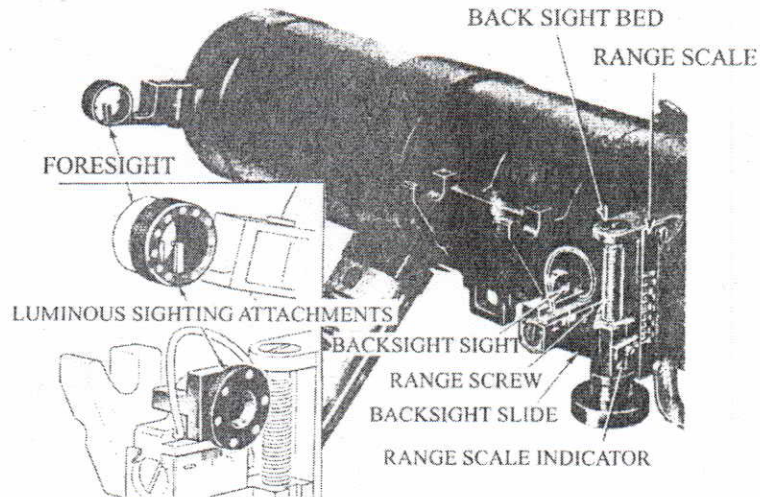


Figure 5-3-3 Luminous Night Sights



## SECTION 4

## AIMING

## RANGE ESTIMATION

1. Range estimation is an essential component of aiming the gun. At close ranges where features are clear, you should aim for vulnerable points on your target such as the turret ring on a tank. At greater distances the aiming point should be the centre of visible mass.

a. Telescopic Sight Unit. The graticule pattern consists of a pointer flanked by a dot, a short vertical line and a long vertical line on each side. A horizontal line runs from each short vertical line to the edge of the sight picture and aids in levelling the gun. On the left side of the sight is the range knob with a range scale showing two sets of figures. To aim the weapon with the telescopic sight carry out the following;

- (1) select the proper range scale by rotating the knob to zero, push in for anti-tank (this aligns the white scale with the pointer) or pull out for high explosive and smoke (this aligns the green scale with the pointer);
- (2) estimate the range to the target. If the target is estimated to be between the 50 m increments, for example 275 m, set the range knob to 300 m and aim slightly lower; and
- (3) looking through the eye piece place the pointer or appropriate lead mark on the centre of visible mass; and

b. Open Sights. To use the open sights, carry out the following:

- (1) fold out the front and rear sight;
- (2) set the estimated range using the correct temperature mark; and

(3) aim as you normally would with a rifle.

2. In order to obtain the proper sight picture targets must be identified in terms of whether they are "**HEAD ON/GOING AWAY**" or "**CROSSING**". Targets that are "**HEAD ON/GOING AWAY**" directly from your position, are aimed at in the same manner as stationary targets. Targets crossing at oblique angles are aimed at in the same manner as normal crossing targets due to the projectile speed and the small difference of lead required.

#### **AIMING OFF MOVING TARGETS**

3. There are two methods of aiming off a moving target. Place the appropriate lead mark on the target and swing with the movement or choose a point of aim well in front of the target and allow it to move into the appropriate lead mark. During strong winds for ranges up to 300 metres, the aiming point should be shifted into the direction of the wind to the appropriate edge (turret), leading or trailing, depending on the direction of the wind. For armoured vehicles without a turret, aim off to the centre of the front or rear third respectively. The sights are arranged as follows:

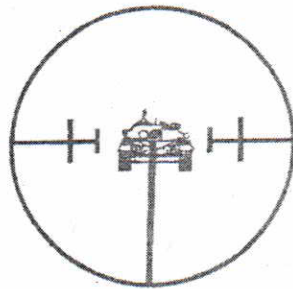
a. Open Sights:

- (1) **LEAD 1** (16 KPH) half way between the blade and the edge of the horizontal bar;
- (2) **LEAD 2** (32 KPH) inner edge of the horizontal bar; and
- (3) **LEAD 3** (48 KPH) increase the lead to half way between the inner edge of the horizontal bar and the ring; and

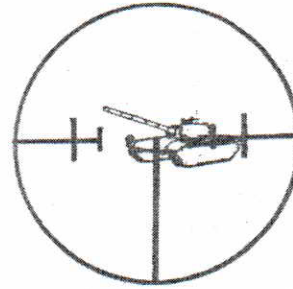
b. Telescopic Sight:

- (1) **LEAD 1** (16 KPH) place the small dot on the centre of mass;
- (2) **LEAD 2** (32 KPH) place the short line on centre of mass; and

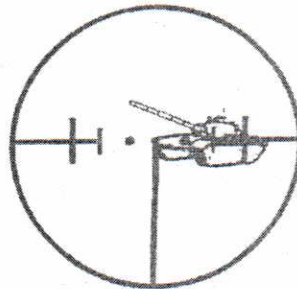
(3) **LEAD 3** (48 KPH) place the long line on the centre of mass.



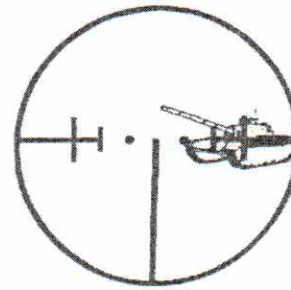
Head on or going away targets showing only the front or back. Place graticule in centre of target.



Slow targets travelling 16 kph. Align first lead mark in centre of target.



Fast targets travelling 32 kph. Align second lead mark on the centre of the target.



Very fast targets travelling 48 kph. Align third lead mark on the centre of the target.

Figure 5-4-1 Graticule Alignment on Moving Targets

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## SRAAW(M) HANDLING TESTS

### SAFETY PRECAUTIONS

1. Gun is unloaded and resting on it's mount. If ordered to handle the gun you will:

- |  |
|--|
| a. check the breach and barrel for any live rounds;          |
| b. examine ammunition to ensure that it is the correct type. |

### LOAD

2. The No. 1 adopts the standing position. The weapon may be fitted with the optical sight or the iron sight may be used. On the command "**LOAD**", without further direction the No. 1 will:

- |  |
|--|
| a. push the cocking handle fully forward with the right thumb returning the right hand to the firing grip with the index finger running along the trigger guard; |
| b. put the safety catch to "S" with the left hand and return the left hand to the front grip;  |
| c. give the order " <b>LOAD</b> " to No. 2; and  |
| d. repeats " <b>READY</b> " after number 2.  |

**FIRING DRILL**

3. The No. 1 will be in the standing position. The gun will be loaded with a dummy round. You will be given a range and an order "FIRE" and "RELOAD". Without further direction, you will perform the following actions:

a. set the range;
b. put the safety catch to "F";
c. aim;
d. take up the first pressure on the trigger;
e. confirm aim;
f. fire the weapon;
g. observe the flight of the projectile;
h. cock the weapon with the right hand;
i. put safety catch to "S" with left hand;
j. order "LOAD"; and
k. maintain sight picture until gun is loaded.



#### UNLOAD

4. The No. 1 will be in the standing position. On the order "UNLOAD", and without further direction you will:

a.	check that the safety catch is at "S" with the left hand, return the left hand to the front grip and with the right hand on the firing grip place the right index finger along the trigger guard;
b.	order "UNLOAD";
c.	on "CLEAR" from No. 2 repeat "CLEAR", put the safety catch to "F" and press the trigger; and
d.	remove or fold the sights.

LOAD

5. On the order "LOAD" from the number 1 and without further direction you will:

a.	repeat "LOAD";
b.	open the breech by pushing the venturi lock knob forward with the right hand and rotating the venturi with the left hand on the venturi lever;
c.	visually examine the breech and barrel for dirt or unburnt propellant. If the chamber is dirty, clean;
d.	pick up the round nose forward with the right hand using the underhand grip, remove the rubber protective cover, and grasp the rim of the round with the left hand placing one finger in the recess in the rim of the round;
e.	insert the round into the chamber ensuring that the recess is in line with the cartridge guide;
f.	close the breech with the left hand;
g.	tap the venturi lock knob to the rear to ensure that the lock is fully closed;
h.	check the back blast area and report "READY"; and
i.	prepare the next round for firing.

#### FIRING DRILL

6. You will be given a range and the order to "FIRE". After the weapon has been fired, the No. 1 will order "RELOAD". Without further direction you will:

a.	open the venturi, remove and throw the empty casing outside of the backblast area;
b.	leave the venturi open and pick up another round;
c.	visually examine the breech and barrel for dirt or unburnt propellant. If the chamber is dirty, clean it;
d.	hold the round nose forward with the right hand using the underhand grip, remove the rubber protective cover and grasp the rim of the round with the left hand, placing one finger in the recess in the rim of the round;
e.	insert the round into the chamber ensuring that the recess is in line with the cartridge guide;
f.	close the breech with the left hand;
g.	tap the venturi lock knob to the rear to ensure that the lock is fully closed;
h.	check the back blast area and report "READY"; and
i.	prepare the next round for firing.

**UNLOAD**

7. On the order "UNLOAD" from the number 1 and without further direction, you will:

a.	repeat "UNLOAD";
b.	open the breech and tap the venturi lock knob forward to partially eject the round or empty casing;
c.	grasp the rim of the round or empty casing with the left hand and remove it from the chamber. An empty casing will be cast aside out of the back blast area. A live round will be caught with an underhand grip of the right hand and place aside;
d.	close the breech with the left hand;
e.	tap the venturi lock knob to the rear;
f.	report "CLEAR"; and
g.	replace the rubber protective cover and replace the round in its container.

## CHAPTER 6

### GENERAL PURPOSE MACHINE GUN (GPMG) 7.62 mm C6

#### SECTION 1

#### CHARACTERISTICS, TECHNICAL DATA AND SAFETY PRECAUTIONS

##### CHARACTERISTICS

1. The GPMG C6 can be used either in the light role when fired from a bipod or in a sustained fire role when mounted on a tripod. Characteristics are as follows:
  - a. fully automatic, belt fed, gas-operated weapon capable of a sustained high volume of fire in bursts;
  - b. air cooled;
  - c. belts are of disintegrating links, factory filled, packed in 220 round belt boxes, and belted in sequence with one tracer round and four ball rounds;
  - d. the C6 has a flat trajectory at ranges up to approximately 600 m. It is capable of laying a cone of fire 600 m long on flat ground, with the bullets never rising more than four feet above the ground;
  - e. at ranges up to 1100 m, the length of the beaten zone is approximately 70 m. It will be less than 70 m only when it is striking rising ground or obstructions or when the gun is fired from an elevated position;
  - f. the barrel is chromed internally to reduce wear;

- g. flash is reduced to a minimum by means of a flash eliminator and the gas regulator;
- h. bipod legs can be folded and locked;
- i. the trigger guard can be removed to allow the trigger to be operated under arctic conditions; and
- j. the carrying handle can be raised to carry the gun and lowered for firing.

#### TECHNICAL DATA

- 2. Technical data is as follows:
  - a. Calibre. 7.62 X 51 mm NATO.
  - b. Weight:
    - (1) GPMG - 11.0kg;
    - (2) barrel - 3.0kg;
    - (3) 220 round belt - 5.4kg;
  - c. Length:
    - (1) GPMG - 1255 mm;
    - (2) barrel - 679 mm;
  - d. Rifling. 4 groove, right hand, 1 turn in 305 mm.
  - e. Cyclic rates of fire. 650 to 1000 rpm adjustable.
  - f. Gas regulator. 3 positions.
  - g. Mode of fire. Automatic only.



- h. Operation. Gas operated, air cooled, belt feed.
- i. Sight adjustment. 200 m to 1600 m in 100 m increments
- j. Effective range:
  - (1) bipod - 800 m; and
  - (2) tripod (SF) - 1800 m.

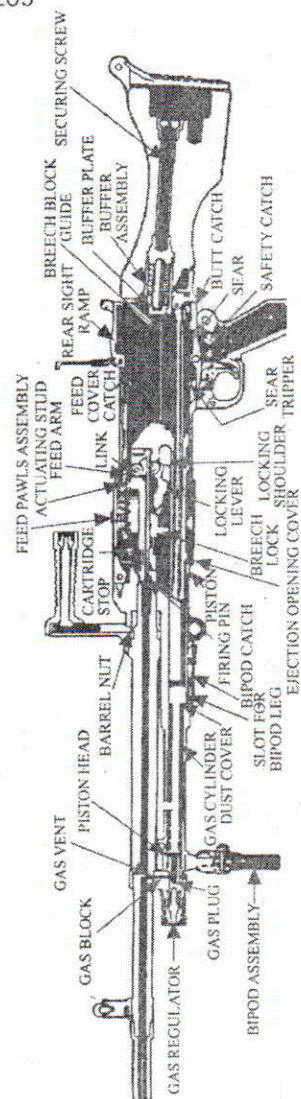


Figure 6-1-1 C6 GPMG - View From Left  
6-1-4

GPMG SECTIONALIZED

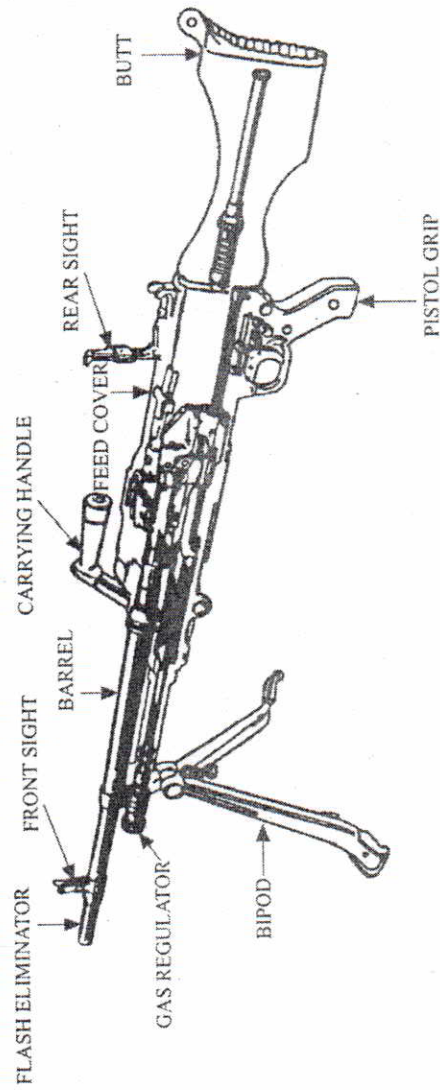


Figure 6-1-2 C6 GPMG - View From Left Rear  
6-1-5

**SAFETY PRECAUTIONS**

3. The safety precautions for the GPMG are similar to those carried out for the C9 LMG. You must always verify that every GPMG is safe to eliminate the possibility of accidents:

a. on the command **"FOR INSPECTION CLEAR WEAPON"**:

- (1) open the feed cover by pushing in the cover catches;
- (2) cock the action by grasping the cocking handle in an overhand grip, pulling it fully to the rear, and then push the cocking handle fully forward;
- (3) lift the feed tray; and
- (4) inspect the chamber and receiver to ensure that they are clear.

b. on the order **"CLEAR"**:

- (1) lower the feed tray and close the feed cover;
- (2) pull the cocking handle to the rear and hold it there, squeeze the trigger and allow the working parts to go forward under control.

c. the above actions will be carried out:

- (1) before and after instruction;
- (2) before stripping;
- (3) before and after range practices;
- (4) during issue and return to stores; and
- (5) when in doubt.

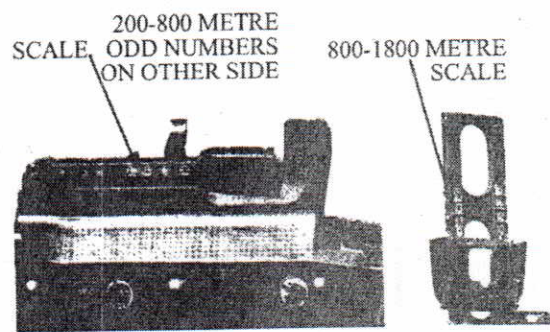


Figure 6-1-3 Rear Sight

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## SECTION 2

### DRILLS

#### HANDLING DRILLS

1. To effectively employ this weapon, you must understand the correct methods of sight setting, loading and unloading:
2. Sights:
  - a. the rear sight can be used either folded down for the light role or raised to a vertical position for sustained fire. Both scales are graduated at intervals of 100 metres. The 200 to 800 m graduations on the outer edges are used when the back sight is folded down; even numbers on the left side and odd numbers on the right. A slide with two spring catches to keep it fixed in any set position, allows range settings to be adjusted. In this position the rear sight forms a battle sight with peep-hole;
  - b. the 800 to 1800 m graduations on the back of the sight are used when it is raised. Sighting is made possible through an aperture indentation found on the lower portion of the adjustable slide;
  - c. the sight should be set at 200 m when not in use; and
  - d. the foresight is a single blade set between two foresight protectors. The sighting arrangement for this weapon is comparable to that of the C9.
3. Load. On the order "LOAD":
  - a. lie behind the GPMG with the legs together;
  - b. hold the small of the butt with the left hand in an overhand grip;

- c. grasp the pistol grip, index finger outside the trigger guard;
  - d. tilt the gun to the right and open the feed cover;
  - e. check that ammunition and belt links are not damaged;
  - f. position the belt on the feed tray, links uppermost, first round against the cartridge stop;
  - g. hold the belt in position with the left hand and close the feed cover; and
  - h. return hands to the correct position on the butt and pistol grip and bring the GPMG to the upright position.
4. Unload. On the order "UNLOAD":
- a. raise the butt into the shoulder and cock the GPMG;
  - b. lower the butt, raise the feed cover, and remove the belt;
  - c. clear the feed tray;
  - d. raise the butt into the shoulder and move the safety catch to "FIRE";
  - e. align the sights on the target and squeeze the trigger; and
  - f. lower the butt and lower the sights.
5. Ready. On the order "READY" or a "RANGE" being ordered:
- a. set the sights;
  - b. lift the butt into the shoulder and cock the GPMG;
  - c. grasp the pistol grip with the right hand and place the index finger on the trigger;

- d. if no fire order is given, move the safety catch to "SAFE" and await further orders; and
  - e. grasp the butt with the left hand.
6. Make Safe. On the order "MAKE SAFE":
- a. unload; and
  - b. reload, (with a new belt if necessary).
7. Clear Gun. On the order "UNLOAD - CLEAR GUN":
- a. unload;
  - b. raise the feed cover; and
  - c. stand up and report "GUN CLEAR", in numerical order.
8. Load and Unload - two-man gun crew:
- a. the gun can be operated by the gunner alone or with the assistance of a No. 2;
  - b. the No. 2 is to lie on the left of the gun close to the gunner;
  - c. when loading, the gunner raises the feed cover and the No. 2 positions the belt on the feed tray, ensuring all fingers are clear before the cover is closed; and
  - d. when unloading, the No. 2 removes the belt from the feed tray.

**IMMEDIATE ACTIONS AND STOPPAGES**

9. Perform IA's and Stoppages:
  - a. the immediate and secondary actions are the drills taken to ensure the gun works properly after a stoppage. A stoppage with the GPMG may be caused by:
    - (1) incorrect preparation of the gun;
    - (2) an obstruction;
    - (3) a fault within the GPMG; or
    - (4) ammunition is expended.
10. Immediate Action Drill:
  - a. if the GPMG fails to fire:
    - (1) cock the GPMG;
    - (2) lower the butt;
    - (3) open the feed cover, clear the feed tray and close the feed cover as quickly as possible;
    - (4) raise the butt into the shoulder and align the sights with the target, and squeeze the trigger. A round may be fired; and
    - (5) lower the butt, reload, raise the butt into the shoulder and cock the GPMG. Realign with the target and continue firing.
11. Gas Stoppage Drill. If the gun fires a few rounds and stops after completing the immediate action drill, carry out the following:
  - a. cock the GPMG;

- b. move the safety catch to "SAFE";
  - c. lower the butt;
  - d. adjust for more gas by turning the regulator clockwise to the desired setting. Normally this can be done with the bare hand; however, if the regulator is too hot to handle use the nose of a round taken from the belt;
  - e. raise the butt into the shoulder;
  - f. move the safety catch to "FIRE"; and continue firing;
  - g. if the GPMG continues to malfunction, change the barrel; and
  - h. during a lull in firing the GPMG is to be unloaded, the barrel removed, and the gas plug and block cleaned.
12. Replacing Barrels:
- a. if after carrying out the gas stoppage drill the stoppage re-occurs, carry out the change barrel drill. Clean and lubricate the gas affected parts as soon as possible;
  - b. barrels must be changed during periods of prolonged firing. For example, 100 rounds per minute for over five minutes. In peace time, after two boxes are fired during a continuous engagement, the barrel is changed to minimize wear and to preserve barrel life. To change barrels:
    - (1) unload the gun, however do not lower the butt, put the sights down;
    - (2) cock the gun, lower the butt and remove the barrel;

- (3) select a barrel and check the serial number, only matching barrels are to be used;
- (4) ensure gas regulator is set correctly;
- (5) insert the barrel and ensure it is securely mounted;
- (6) stow the hot barrel; and
- (7) load the gun.

13. Runaway Gun. A runaway gun is one which continues to fire after the trigger has been released. When this occurs, hold gun firmly into shoulder, twist belt at point of entry into feedway, thus breaking the belt or jamming the feed. Once the gun has stopped:

- a. unload;
- b. adjust for more gas; and
- c. reload, and continue firing.



14. Other Stoppages - types, causes and remedies:

SER	TYPE	CAUSES	REMEDIES
(a)	(b)	(c)	(d)
1.	FAILURE TO EXTRACT	-broken claw or spring -fouling in chamber	-change -clean
2	MISFIRE	-broken or damaged firing pin -light strike or incomplete closing of the mechanism	-change -clean and oil gun
3	FAILURE TO EJECT	-broken or damage ejector -broken or weak ejector spring -broken extractor	-change -change -change
4	FAILURE TO FEED	-component of feed mechanism broken -return spring broken	-correct -replace
5	SHORT RECOIL	-fouling in weapon -mechanism not held to rear when trigger released -defective trigger	-clean -adjust gas regulator -report to a technician
6	INCOMPLETE CLOSING	-fouling of the mechanism or gun body -return spring broken -return spring weak	-clean the gun -replace -replace
7	RUPTURED CASING	Insert the forward end of the clearing plug into the chamber. Ensure the separated casing in on clearing plug.	

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**SECTION 3****HOLDING, AIMING AND FIRING****HOLDING AND AIMING**

1. In order to bring effective fire on the enemy you must know how to hold, aim, and fire the gun using the best length of burst against both stationary and moving targets:
  - a. when a range is ordered, carry out the appropriate drill;
  - b. the aiming procedure is identical to that of the C9;
  - c. when a target is indicated, use the left hand under the gun to move it as required to line up the gun, body, and target, open the legs and lay heels flat on the ground;
  - d. adjustments for height can be made by moving the elbows inward or outward until the correct position is found;
  - e. move the whole body up to the gun until the right shoulder is firmly in contact with the butt;
  - f. pull the butt backward and downward with an overhand or underhand grasp of the left hand and placing the left elbow on the ground even with the right elbow so that the shoulders remain square to the front;
  - g. hold the pistol grip firmly with the right hand, index finger on the trigger and pull the gun backward and upward into the shoulder;
  - h. lock your hold on the GPMG by turning the wrists inward and resting your cheek on the back of your left hand if using the overhand grip, or on the small of the butt if using the underhand grip; and

- i. test your hold by rocking backward and forward slightly; the foresight should move directly up and down on the point of aim.

#### FIRING

2. Firing the GPMG requires the same marksmanship techniques that are used with the C9:

- a. on the order **"FIRE"**, when the hold and aim are correct, the trigger should be squeezed long enough to fire a burst of three to five rounds and then must be fully released to allow it to go forward;
- b. observation of the affects of the burst is most important. The moment the trigger is released, the left eye should be opened and the area of the target observed to ascertain the impact of the rounds;
- c. make any necessary adjustments to the sights or aim and then continue firing at the normal rate of about 50 rounds per minute. If **"RAPID FIRE"** is ordered, increase the rate to about 100 rounds per minute;
- d. on the order **"STOP"**, cock the GPMG, move the safety catch **"SAFE"** with the left hand and lower the butt. If the belt has only a few rounds left, connect another belt to it;
- e. on the order **"GO ON"**, realign on the target, test the hold, move the safety catch to **"FIRE"**, and continue firing;
- f. on the order **"STOP - MAKE SAFE"**, carry out the appropriate drill; and

- g. it is the task of the No. 2 if one is present, to see that there is always a supply of ammunition for the GPMG. This is done by clipping-on additional belts as necessary. It is not necessary for No. 2 to hold the belt during firing, only to straighten the belt so that it will feed correctly.

#### RATES OF FIRE

3. There are two rates of fire:
  - a. Normal rate. Fifty rounds per minute fired in bursts of three to five rounds; and
  - b. Rapid rate. One hundred rounds per minute fired in short bursts. Rapid fire is the fastest rate at which accuracy can be maintained. It is only to be used when warranted, for example, a large number of enemy in the open at short range or for short periods when providing covering fire for friendly troops.

#### BURST LENGTH

4. Two burst lengths may be used:
  - a. Short burst. A short burst of three to five rounds is necessary to observe the impact of rounds and to correct errors in range and wind allowance. The length of bursts will be determined by the type of target, the range to the target and the skill of the gunner; and
  - b. Long burst. A long burst of eight to ten rounds spreads more but presents a better chance of hitting a moving target. It may be used at very short range against a mass attack. It can also be effective when fired at the front of some armoured fighting vehicles, particularly if aimed at devices which assist crew vision such as periscopes, lights, image intensification or infra-red equipment.



### MOVING TARGETS

5. Select a point of aim well in front of the line of advance of the moving target. Aim at it and when the target is two widths from the point of aim, fire a long burst.

### FIRING POSITIONS



Figure 6-3-1 Prone Position





Figure 6-3-2 Close Quarter Battle Position



Figure 6-3-3 On Guard Position

## C6 HANDLING TESTS

### SAFETY PRECAUTIONS

1. You will be ordered to bring the gun to the centre of the room or another position on the firing point. Without further direction you will perform the following actions:

a.	open the feed cover by pushing in the cover catches;
b.	cock the action by grasping the cocking handle in an overhand grip, pulling it fully to the rear, and then push the cocking handle fully forward;
c.	lift the feed tray;
d.	inspect the chamber and receiver to ensure that they are clear; and
e.	inspect the ammunition to ensure it is all dummy, undamaged and correctly linked.

<b>"CLEAR"</b>	
f.	lower the feed tray ;
g.	pull the cocking handle to the rear and hold it there, squeeze the trigger and allow the working parts to go forward under control.

## LOAD

2. You will be ordered to adopt the prone position with an ammunition box to the left of the gun. Time will be taken from the order "LOAD" until you have your hands back in the fire position and the gun is upright. You will have 12 seconds to complete the following:

"LOAD"
a. lie down behind gun with legs together;
b. hold the small of the butt with the left hand in an overhand grip;
c. grasp the pistol grip, index finger outside the trigger guard;
d. tilt the GPMG to the right and open the feed cover;
e. check that the ammunition and belt links are not damaged;
f. position the belt on the feed tray, links uppermost, first round against the cartridge stop;
g. hold the belt in position with the left hand and close the feed cover; and
h. return hands to the correct position on the butt and pistol grip and the GPMG to the upright position.



READY

3. On the order "300 FIRE", without further direction you will perform the following actions:

"300 FIRE"
a. set the sights to 300 m; (battle sight is 200 m)
b. lift the butt into the shoulder and cock the GPMG;
c. grasp the pistol grip with the right hand with the index finger on the trigger;
d. grasp the butt with the left hand;
f. aim and "Fire" weapon.(if no further order is received, apply the safety catch with the left hand)

**UNLOAD**

4. You will receive the order "STOP". After the appropriate actions have been carried out you will receive the order "UNLOAD, CLEAR GUN". Time will be taken from the order to unload until you are standing up behind the gun. You have 12 seconds to complete the unload. Without further direction you will perform the following:

"STOP"
a. cock the GPMG;
b. put the safety catch on "SAFE" with the left hand;
c. lower the butt;
"UNLOAD, CLEAR GUN"
d. raise the butt into the shoulder and cock the GPMG;
e. lower the butt and raise the feed cover;
f. remove the belt and clear the feed tray;
g. close the feed cover;
h. raise the butt into the shoulder and set the safety catch on "FIRE";
i. align the sights on the target and squeeze the trigger; and
j. lower the butt, lower the sights, raise the feed cover, stand up and report "GUN CLEAR".



## CHAPTER 7

### FRAGMENTATION GRENADE M67

#### SECTION 1

#### CHARACTERISTICS AND SAFETY PRECAUTIONS

##### GENERAL

1. Grenades are used in close quarter fighting, to clear the enemy from slit trenches, buildings and any position that cannot be neutralized with direct fire. The risk of casualties to one's own troops when the grenade is used, particularly those who are in the open, must always be taken into consideration.

##### CHARACTERISTICS

2. Characteristics of the M67 Grenade are:
- a. Weight. 0.45 kg.
  - b. Fuse:
    - (1) issued primed from the manufacturer, and
    - (2) No preparation is required.
  - c. Delay time. 4.5 second fuse.
  - d. Method of delivery. Hand thrown.
  - e. Killing radius. Lethal radius of up to 18 metres from the point of burst.
  - f. Danger radius. 300 m from point of burst.

3. The M67 has a spherical shape. It has the following main components:

- a. body assembly,
- b. bursting charge,
- c. fuse, and
- d. safety clip.

4. Inside the tin body is a closely wound coil of hard drawn steel wire. The wire has notches cut at regular intervals on its interior surface. The notching of the coil wire provides the fragmentation effect of the grenade.

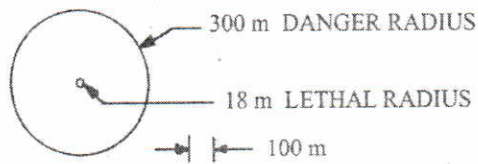


Figure 7-1-1 Lethal and Danger Radius of the M67 Grenade

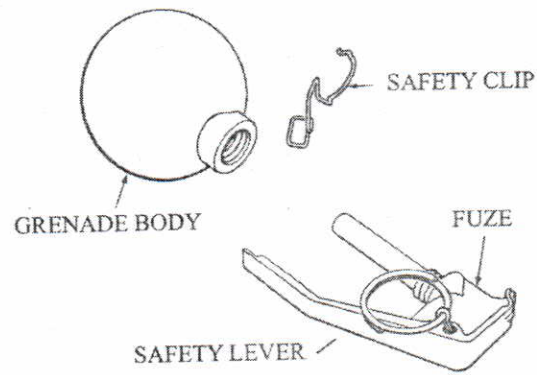


Figure 7-1-2 M67 Grenade - Visible Components

5. The grenade is painted olive drab and has the following information stencilled in yellow on the exterior:

- a. designation of grenade,
- b. filled lot number,
- c. month and year of filling, and
- d. type of filling.



Figure 7-1-3 M67 Grenade Markings

#### SAFETY DEVICES

6. There are three safety devices on the grenade:
  - a. the safety lever,
  - b. the safety pin, which secures the safety lever, and
  - c. the safety clip, which secures the safety lever should the pin be removed unintentionally.
7. When the safety clip and pin are removed and the safety lever released, the striker spring forces the striker to rotate on its axis to strike the primer. The flash from the primer ignites a safety fuse which burns for 4.5 seconds before initiating the detonator. The detonator in turn initiates the main explosive charge in the grenade. The explosion of the main charge causes the steel body to rupture and to project the steel wire which is broken into many fragments of uniform size and weight, up to a distance of 200 metres or more.

#### SAFETY PRECAUTIONS

8. The M67 Grenade is issued in individual containers, primed and ready for throwing. Safety precautions must be carried out in the following sequence:

- a. remove the top portion of the container. DO NOT REMOVE THE GRENADE FROM THE CONTAINER;
- b. inspect the top portion of the grenade to ensure that the safety pin and safety clip are secure in their correct positions and that the grenade has been packed right-side-up;
- c. if the safety pin and safety clip are not secure, are missing, or if the grenade is upside-down, it must NOT be removed from the container;
- d. the safety pin and safety clip must NEVER be removed unless the grenade is to be thrown forthwith;
- e. if the safety pin and safety clip are secure the grenade can be removed from the container;
- f. check the body for cracks;
- g. inspect for a broken safety lever, damaged safety pin, safety clip and pull ring; and
- h. damaged grenades will be treated as duds and will be destroyed in accordance with local Range Standing Orders.

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## SECTION 2

### THROWING DRILLS AND POSITIONS

#### READY POSITION

1. In adopting the ready position, the following is carried out:
  - a. the grenade is held in the right hand in an overhand grip. The safety lever is retained in the palm of the hand between the thumb and index finger;
  - b. the thumb and forefinger of the left hand are placed on the safety clip;
  - c. the grenade is held against the body at waist height. The body is then turned to the right so that the left shoulder and foot are oriented toward the target;
  - d. for a LEFT HANDED thrower the grenade is held in the LEFT hand. The thumb and index finger of the RIGHT hand is placed on the safety clip. The body is turned to the left so that the right shoulder and foot are oriented toward the target.

#### THROWING DRILLS

2. On the command "READY":
  - a. the thrower must first remove the safety clip from the safety lever and rotate the safety clip counter-clockwise as far as possible; and
  - b. on completion of this rotation of the safety clip, the first or second finger of the LEFT hand is placed through the safety pin ring.

3. On the command "THROW":
  - a. the thrower swiftly pulls the RIGHT hand down and to the rear while holding on to the safety pin ring securely with the LEFT hand at waist level. This downward movement and rearward thrust pulls the grenade away from the safety pin;
  - b. the thrower must glance down to ensure that the safety pin has been completely removed from the grenade and that the safety lever remains secure; and
  - c. the thrower then looks at the target and ensures that the left shoulder is pointing in it's direction.

NOTE

The above sequence of throwing the grenade must be performed in one motion.

4. Method of throwing:
  - a. the LEFT arm is extended in the direction of the target; and
  - b. the body is swung backwards as far as possible allowing the LEFT hand and LEFT foot, if necessary, to come up naturally. Then without pause the body and the straight RIGHT arm are swung quickly upward and forward in an arc. The grenade is released as the hand reaches its highest point above the shoulder. The fall of the grenade must be observed.

NOTE

During field firing or in an operational situation the above commands and procedures will be modified to suit the tactical situation; however, the report "**GRENAD**E" must be given by the thrower when delivering the grenade. This is used to warn fellow soldiers in the area.

**THROWING POSITIONS**

5. Standing Position. The standing position is used when the thrower is in a trench or behind high cover. The thrower gets into the "Ready Position" and making full use of the cover, throws the grenade and then ducks behind the cover. If at all possible the fall of the grenade should be observed;



Figure 7-2-1 Standing Position

6. Kneeling Position. The kneeling position is used when the thrower is behind cover of medium height such as an embankment,

ditch, low wall, etc. The thrower kneels on the RIGHT knee, bends the LEFT leg and keeps the LEFT foot flat on the ground. The thrower ensures that the LEFT shoulder is pointing towards the target. The thrower extends the body quickly backwards, throws the grenade, then immediately lies down behind cover. When the cover is lower than is practical for throwing from the kneeling position, the modified kneeling position may be used.



Figure 7-2-2 Kneeling Position

7. Modified Kneeling Position. The thrower kneels on the LEFT knee but extends the RIGHT leg straight out to the rear. To adopt an even lower position, the thrower can bend forward. The thrower must ensure that the LEFT shoulder is pointing towards the target. The thrower then extends the body quickly backwards, throws the grenade and immediately lies down behind cover.



8. Prone Position. When there is virtually no cover the prone position must be used. The LEFT shoulder is still pointed toward the target. The body should be swung quickly backwards and after the grenade is released, the thrower must take extra care to ensure the whole body is behind cover.



Figure 7-2-3 Prone Position

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### M67 GRENADE HANDLING TESTS

1. On the command "CARRY OUT SAFETY PRECAUTIONS":

a.	remove the top portion of the container. Do not remove the grenade from the container;
b.	inspect the top of the grenade ensuring that the safety pin and safety clip are in the proper position and that the grenade is right side up;
c.	if the safety pin and safety clip are secure remove the grenade from the container;
d.	check the body for cracks; and
e.	inspect the safety lever, safety pin, safety clip and pull ring for damage.

2. On the command "ADOPT THE READY POSITION":

a.	hold the grenade in the right hand with an overhand grip;
b.	the safety lever is retained in the palm of the hand between thumb and forefinger;
c.	the thumb and forefinger of the left hand are placed on the safety clip;
d.	the grenade is held waist high against the body; and
e.	the body is then turned so that the left shoulder and foot are pointing toward the target.

3. On the command "READY":

- |    |   |
|----|---|
| a. | the thrower removes the safety clip from the safety lever by rotating the safety clip counter-clockwise as far as possible; |
| b. | the thrower places the first or second finger of the left hand through the safety pin ring.                                 |

**NOTE**

A left-handed thrower will hold the grenade in the left hand with the first or second finger of the right hand placed through the safety pin ring. The right shoulder and foot are pointing toward the target.

4. On the command "THROW":

- |    |   |
|----|---|
| a. | the thrower swiftly pulls the right hand down and to the rear while holding on to the safety pin ring securely with the left hand at waist level; |
| b. | the thrower glances down to ensure that the safety pin has been removed and that the safety lever remains secure;                                 |
| c. | the thrower looks at the target and ensures that the left shoulder is pointing in it's direction;   |
| d. | the thrower extends the left arm in the direction of the target;  |
| e. | the body is swung back as far as possible allowing the left arm and foot to come up naturally and without pause;                                  |
| f. | the body and straight right arm arc forward releasing the grenade as the hand reaches the highest point above the shoulder; and                   |
| g. | the thrower observes the fall of the grenade and takes cover.   |

**THROWING TEST M67 GRENADE**

1. On the command **"ADOPT THE STANDING POSITION"**:

a.	adopt the standing position making full use of cover;
b.	carry out the drill for <b>"READY"</b> as detailed;
c.	<b>"THROW"</b> the grenade into the target area;

2. On the command **"ADOPT THE KNEELING POSITION"**:

a.	adopt the kneeling position making full use of cover;
b.	carry out the drill for <b>"READY"</b> as detailed;
c.	<b>"THROW"</b> the grenade into the target area;

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**CHAPTER 8****FIELD CRAFT****SECTION 1****PERSONAL AND FIELD EQUIPMENT****PERSONAL EQUIPMENT**

1. You have been issued personal equipment, clothing and load carrying kit designed to meet various field training and tactical conditions. It is durable, relatively easy to maintain and designed to give maximum utility. The web gear is specifically designed to be interchangeable, lightweight and provide maximum load carrying capacity. There are three variants of the web gear allowing it to be reconfigured to suit the requirements of specific operations. The variants are; "Fighting Order", "Battle Order" and "Marching Order".

**FIGHTING ORDER**

2. Components:

- a. Utility Belt - carries fighting load components;
- b. Yoke - supports the belt and other components;
- c. Hook-Strap-Assembly - supports belt or load carriers;
- d. Utility Pouch - carries mess kit, extra ammo or rain gear;
- e. Canteen Carrier - carries plastic canteen and canteen cup;
- f. Carrier, KFS - carries knife, fork, spoon set and knife C5;
- g. Scabbard Bayonet Holder - holds bayonet and scabbard;

- h. Two C7 Magazine Carriers - holds two C7/C9 mags each; and
- i. Combat Shovel Carrier - holds the combat shovel (when issued).

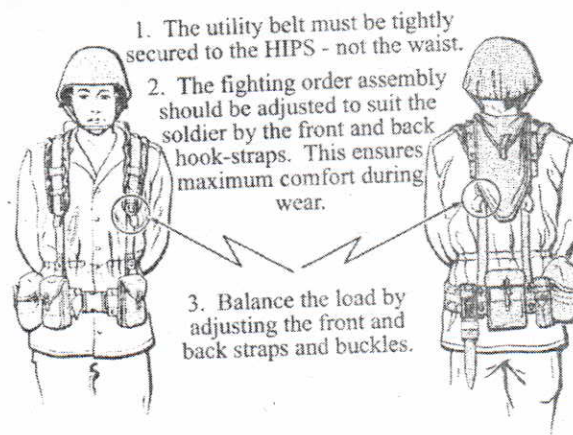


Figure 8-1-1 Fighting Order

3. The Fighting Order has been designed so that the belt is tightly secured around the hips not the waist. This is accomplished by adjusting the hook straps so that any weight on the shoulders is distributed equally through the yoke. Additional items such as the wet weather clothing, extra socks, foot powder, camouflage stick and insect repellent are carried as directed by your unit. Non-issue equipment including civilian pattern knives and foreign pattern bayonets will not be worn on the fighting order.



**BATTLE ORDER**

4. Battle order is a re-configuration of the fighting order webbing. It enables you to carry more weight, allowing you to operate in the field for longer periods without requiring replenishment. The utility pouch is removed or repositioned (optional), to allow the small field pack to be fastened to the rear centre of the utility belt. The small field pack is primarily worn attached to the belt, but for short-term use may be carried by its sling worn across the shoulder.

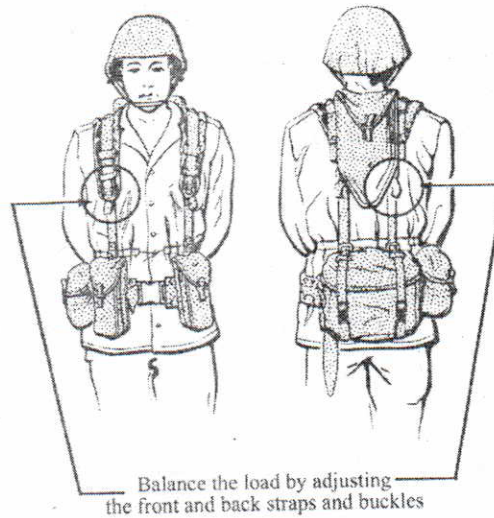


Figure 8-1-2 Battle Order

**MARCHING ORDER**

5. Marching order consists of those items of equipment necessary to support a soldier in the combat zone for an indefinite period of time. It consists of the large pack along with the webbing re-configured from the fighting order. When re-configuring fighting order to marching

order, the utility pouch is removed and stowed inside the small field pack. When re-configuring battle order to marching order, the small field pack is removed and stowed inside the large field pack.

6. The belt on the large pack assembly fits around the waist and is secured over the fighting order:

- a. pack reducing straps are used to reduce the volume of the large field pack which forces the centre of gravity of the load closer to the body;
- b. the sleeping bag must be compressed when packed in the valise;
- c. two small loops and "D" rings on the large field pack can be used to carry small items of equipment (thermos bottle);
- d. the inside pocket of the large field pack can accommodate the AN/PRC-77 radio set;
- e. skis and snowshoes can be secured to the large field pack by passing them through the space between the cargo pack and the outer pouches; and
- f. the quick release straps used only in emergencies, offer an easy method of removing the field pack assembly from the body.



Figure 8-1-3 Marching Order

### MAINTENANCE

7. Cleaning. The following procedures must be followed when cleaning personal field equipment:

- a. remove mud or dirt from equipment using a soft brush or damp cloth. Be careful not to puncture or cut the fabric;
- b. wet the soiled surface of the material and apply a solution of detergent or mild soap and warm water. Scrub the area with a soft brush, cloth, or sponge;
- c. use clean warm water to rinse the cleaning solution from the material;
- d. allow the equipment to dry. Do not place it in direct sunlight, direct heat, or beside open flames;
- e. scrub the hook and pile fasteners (velcro) with a soft brush to remove dirt and leave open to dry; and

- f. lubricate zippers with wax, graphite, or hard soap on a regular basis.

#### FIELD MAINTENANCE

- 8. Field Maintenance. Field expedient maintenance is limited to repairing damaged portions or loose stitching, by hand sewing or taping the affected parts.

#### ENVIRONMENTAL CLOTHING

- 9. The environmental clothing or combat clothing that you wear has been designed to fit loosely and to be virtually maintenance free:
  - a. the velcro pocket on the inside of your combat shirt provides you with a secure place to store valuables;
  - b. the draw strings on the shirt and jacket allow the lower portion of either garment to be snugged around the waist and the hips to retain body heat;
  - c. the combat shirt and combat trousers feature large cargo pockets for carrying rations, maps, rain gear, etc.;
  - d. combat trousers come with an insert designed to be fitted into the tops of the combat boots, to trap body heat and to prevent contamination of the feet and legs;
  - e. the combat jacket features large cargo pockets to facilitate carrying extra ammunition, rations, etc.;
  - f. combat clothing is cared for in the same manner as regular clothing. Normal washing followed by air drying will maintain its condition for many years. DO NOT IRON; and
  - g. footwear consists of the standard combat boot. It is rugged and reasonably waterproof when treated with silicone. The boots provide ankle support for rough country. Regular

washing with a mild soap followed by a thorough rinsing in cold clear water will allow the leather to "breathe". After washing the boots must be blackened with the standard issue compound and treated with a water repellent.

#### FIELD EQUIPMENT

10. To allow you to work and live comfortably in all climactic elements, you have been provided with the following equipment:

- a. rain gear consisting of jacket, hood and trousers. Care must be taken to avoid tearing the material when operating around equipment or while in heavy brush. If a tear does occur an effective temporary repair can be made with gun tape;
- b. an air mattress which is of a pneumatic type and is fitted with a bellows (air bag) to assist with inflation. Each mattress is issued with a repair kit to fix minor punctures. You may be issued with a newer type of air mattress which is self inflating and is equipped with a screw type valve;
- c. a sleeping bag, issued in four parts. The valise (bag carrier) which carries the compressed sleeping bags in a manageable waterproof package. The inner and outer, down filled sleeping bags are designed to retain body heat in conditions well below the freezing point. You also have a cotton sleeping bag liner which aids in retaining body heat and provides a washable insert that reduces the chance of contaminating the interior of the bag. The bags and bag carrier should be aired out daily. Avoid getting the bag wet. The liner can be washed with the remainder of your clothing. The bags must be dry cleaned;
- d. your shelter half which can also be joined to other shelter halves is an effective barrier against the elements; and
- e. the bivvy bag constructed of gortex fabric provides a waterproof one person shelter.



## PERSONAL CAMOUFLAGE AND CONCEALMENT

11. There are eleven reasons why things are seen. If you fail to consider these when camouflaging yourself and your position, you will be easily detected. The reasons why things are seen are:

- a. Shape. At a distance the outline of objects can be recognized long before the details or make-up can be determined. Trucks, guns, tanks and helmets all have a distinctive outline that can be used to identify them.
- b. Shadow. The effect of shadow on the human eye must be understood by everyone using camouflage and concealment. Objects in shadow may be missed because the eye tends to accept conspicuously dark or light areas as uniform and does not seek minor differences in shade. Objects illuminated in dark shadow however, will be easily detected as will dark shadows against a bright background surface. In addition, you must realize that although you may be hidden from direct view of an enemy soldier, your shadow may not be.
- c. Silhouette. Anything silhouetted against a contrasting background is conspicuous. Any smooth flat background such as water, a field or even the sky, will contrast starkly if you stand in front of them.
- d. Movement. Although this factor seldom reveals the identity of an object by itself, it is the most important one for revealing existence. Nothing catches the eye quicker than sudden movement. No matter how well concealed you are, if you are not careful when you move you will give yourself away.
- e. Spacing. In nature, things are seldom regularly spaced. Regular spacing usually indicates man-made objects and attracts the eye.
- f. Position. An object is often identified by its position in relation to its surroundings. A long object on a railroad track is



assumed to be a train, large objects on roads are assumed to be vehicles. Similarly, objects spotted on a trail are assumed to be personnel.

- g. Texture. Texture refers to the ability of an object to reflect, absorb and/or diffuse light. It may be defined as the relative smoothness or roughness of a surface. The rough surface of foliage on the helmet will absorb more light and have it remain undetected while the smooth surface of a bare helmet will reflect light and be easy to see.
  - h. Colour. Colour is an aid to an observer when there is a contrast between the colour of an object and its background. The greater the contrast in colour, the more visible the object.
  - i. Scale. Objects that differ greatly in size from those around them will be more distinguishable than those amongst others of approximately the same size.
  - j. Noise. Sudden noises contrast with the normal quiet of the area of operations. Loud noises such as the running of generators, slamming vehicle doors, playing radios and even cocking weapons can easily be heard.
  - k. Shine. The almost total absence of texture results in shine. Shine is generally associated with the reflection of sunlight which can be spotted over great distances.
12. Personal Camouflage. Camouflage discipline must be constantly observed as surroundings change, shadows move and foliage wilts. Camouflage discipline must also be maintained during the hours of darkness as we now have widespread use of surveillance devices on the modern battlefield; therefore, we must treat night as day. The tone and colour of the hands, neck and face and the shape, surface and silhouette of helmets and personal equipment must not contrast with their surroundings:

- a. Skin. Camouflage cream, mud, burnt cork, charcoal or something similar should be put on the face paying particular attention to the nose, tips of ears, forehead, neck and hands.

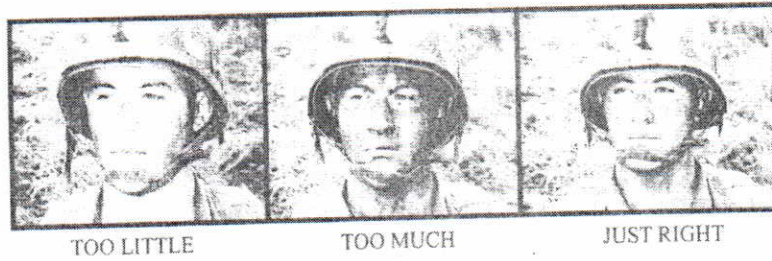


Figure 8-1-4 Skin Camouflage

- b. Helmet. The outline of the helmet is one of the striking characteristics of a soldier's equipment and its familiar curved shape can easily be identified. One of the first steps for individual camouflage is the disruption, both of the form of the helmet and the strong straight lined shadow it casts. The helmet cover should be in place to camouflage and eliminate shine. Its outline should be broken up with foliage stuck in the helmet band and in the holes of the cover.



Figure 8-1-5 Helmet Camouflage

- c. Personal Weapons. Personal weapons may be camouflaged by binding scrim or hessian around the forestock and butt. Care must be taken to keep the sights and moving parts free from obstruction.

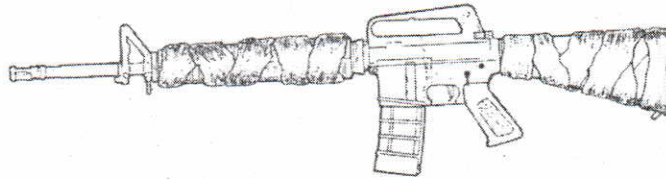


Figure 8-1-6 Weapon Camouflage

- d. Personal Equipment. Age and repeated cleaning will fade much of your equipment to a lighter colour. When this occurs, it must be darkened with paint, mud, charcoal or anything else that will reduce the contrast. To break up the shape, web gear

should be covered with hessian, foliage or grass, interspaced to look as natural as possible.

8-1-12

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## SECTION 2

### INDIVIDUAL FIELD MOVEMENT

#### GENERAL

1. There are six individual fieldcraft movements that allow you to move about the battlefield relatively safely, especially when you use all available cover. When you combine them with the various fire positions, they will enable you to remain undetected while in contact with the enemy.

#### MONKEY RUN

2. The monkey run is useful when moving behind cover that is about two feet high. You can move quite quickly but noise becomes a factor. This movement is simply crawling on your hands and knees. To be as quiet as possible, choose your path carefully. Avoid placing your hands and knees on dry material that will snap and crack. The rifle is held at the point of balance in the hand that supports it when firing.





Figure 8-2-1 The Monkey Run

### LEOPARD CRAWL

3. The leopard crawl is useful when moving behind very low cover. This movement consists of crawling on elbows and the inside of the knees. The body is propelled along by the movement of alternate elbows and knees, rolling the body a little as each knee is bent or by trailing one leg behind and using only one knee. Keep your heels, head, body and elbows down and maintain observation as you go.





Figure 8-2-2 The Leopard Crawl

#### ROLL

4. The roll is often the quickest way of getting away from a location, such as a crest line where the enemy has seen you. This method works only on level ground or downhill. It is hard to control direction during the roll. The disorientation caused by the sudden movement will be overcome with practice. While performing the roll, the arms and weapon (safety catch on safe) are securely held close to the body.

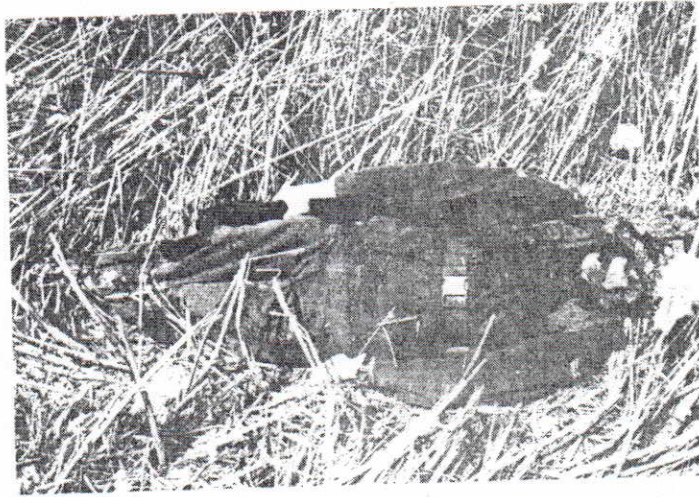


Figure 8-2-3 The Roll

### WALK

5. The walk is used during patrolling and stalking operations. It is intended to allow upright movement while maintaining stealth and the element of surprise. The following must be remembered when performing the walk:

- a. carry the weapon in the ready position by grasping the pistol grip, positioning the butt on the outer forearm of the trigger hand, with the weapon pointing in the direction of observation;
- b. remain alert, head up and observing your arc;
- c. step silently by placing the sole of the boot, toe first and then rolling the foot from the outside edge in, until it is flat on the ground; and
- d. the knees should be slightly bent to maintain balance.



Figure 8-2-4 The Walk

#### **STOMACH CRAWL**

6. The stomach crawl is slow and tiring. It should only be used when the utmost caution is required. It is particularly useful when forced to make use of very low cover or when crawling in the open. The whole body is pressed as close to the ground as possible. Movement is obtained by pushing with the insides of the feet. The heels are kept on the ground. It is natural to look down most of the time; however, frequent pauses must be made for observation. The



weapon is held in the same way as the leopard crawl.



Figure 8-2-5 The Stomach Crawl

### **RUN**

7. This method is used to move from place to place when speed is more important than stealth. When performed properly, the soldier is exposed as a target for an absolute minimum of time during each move. Unless absolutely necessary, this move should not be employed for great distances as it quickly produces fatigue. The following techniques should be remembered when performing the run:

- a. the run is faster than a double-time;
- b. normally a zig-zag pattern is used but a dash may be required;
- c. bounds should be kept short to allow you to take effective action upon arrival at your new position;

- d. equipment must be properly secured to minimize bouncing and noise;
- e. the weapon must be securely held to avoid being dropped or becoming entangled; and
- f. the weapon's muzzle must be controlled as each new position is adopted to avoid digging the barrel into the ground.

#### TURNING

8. This movement is performed whenever necessary to observe or fire in a new direction. This is particularly crucial when under enemy fire or in sight of the enemy. To turn to the right in the prone position, ease the body as far to the right as possible keeping the legs together. The left leg is then moved as far to the left as possible, the right leg is now closed to the left leg and body moved still further to the right. These movements are repeated until the body is facing the desired direction. Reverse the movement to turn to the left.

9. Turns from the standing position are achieved by lifting one foot and placing it down quietly but firmly in the new direction. Once stable, the other foot is moved to the new direction in the same manner. Ensure that observation in the direction of the objective is maintained during this movement.



Figure 8-2-6 Turning - Prone Position



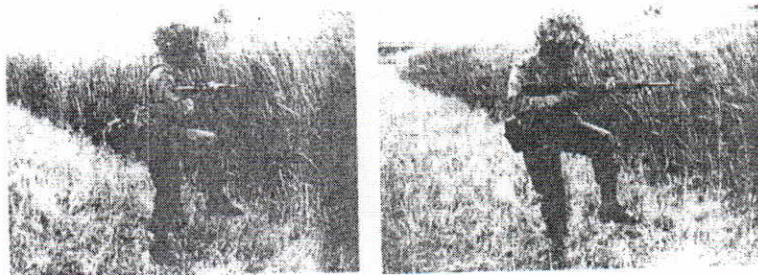


Figure 8-2-7 Turning - Standing Position

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## SECTION 3

## TRENCHES

## GENERAL

1. Recent experience in countries where Canadian Peacekeepers are serving prove the continued need for self protection from small arms and indirect fire. The slit trench remains as one of the fundamental methods of personal protection against flying projectiles. You might think that only the infantry have to worry about burrowing into the earth when they establish defensive positions; however, you could very well find yourself on a UN task were bullets and mortar bombs fail to discriminate between cook, clerk and infanteer. A properly prepared slit trench will protect you from all but a direct hit.

2. Initial Preparation. Once your trench has been sited, you must put your equipment in the alarm position. You must do this automatically without waiting to be told. Rifles and LMG's must be put on top of or at the side of your equipment within arms reach and pointing to the centre of your arc of fire. If there is a chemical warfare (CW) threat the mask must be carried even while you dig and you must be in TOPP Medium. The purpose of this methodical layout and preparation is to ensure that there is no confusion if attacked, especially after dark. Alarm positions will be used until trenches are deep enough to give more protection. As soon as possible, the unit will practice a stand-to.

3. Construction. The main threat to you when you are dug in are mortar and artillery shells with a variable time fuse. This type of fuse has a delay mechanism which allows the projectile to penetrate into the soil, detonating below the surface of the ground causing greater damage than shells which explode on contact. However, by designing your trench properly, it will be capable of surviving all but a direct hit. When constructing your trench you must consider:

- a. the ability to employ your personal weapon effectively,

- b. a high degree of protection,
- c. the speed of construction, and
- d. concealment.

#### SHELL SCRAPES

4. Shell scrapes are quickly dug shallow excavations (0.5 m) that give temporary protection in the prone position should you find yourself suddenly pinned down by enemy fire. Full use should be made of existing natural cover, provided by undulating ground or shell holes.

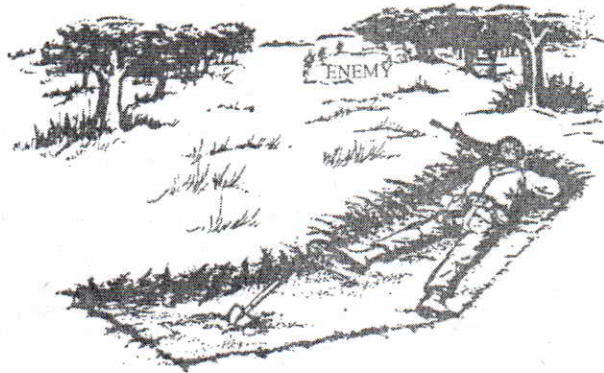


Figure 8-3-1 Shell Scrape

#### FIRE TRENCH

5. The fire trench and shelter is the standard form of trench used. It is simple to construct and easy to conceal. Owing to its narrow width it provides excellent protection from all types of fire and from the crushing effect of AFVs passing overhead. It is relatively easy to excavate. The exact dimensions should conform to you and your "battle buddy's" requirements and give as much protection and comfort as possible.

6. The stages for construction of the standard fire trench are as follows:

- a. Stage 1 - Siting. The fire trench is dug to a depth of 75 cm. Stage 1 will protect two soldiers in a sitting position. It is important to save the natural ground cover since the earth underneath usually contrasts sharply with the topsoil. Similarly, sod must be saved for the same reason, the site should not betray the construction of a fire trench. You must clear the natural ground cover around the trench for a distance of 2.5m. If the ground is grass covered, cut the sod into blocks and pile it, grass to grass, earth to earth. The sod must not be piled in the field of fire. While removing the topsoil be careful not to obliterate the original trench outline.

Strip the turf from the whole area within the dotted line.

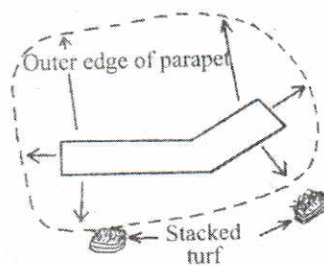


Figure 8-3-2 Stripping the Turf

- b. Stage 2 - Standing. The fire trench is deepened to a depth of 1.4 m. Stage 2 will protect two soldiers in the standing position.

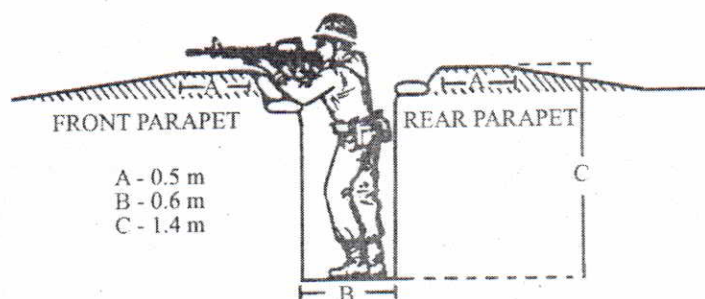


Figure 8-3-3 Standing

- c. Stage 3 - Drainage Sump. A drainage sump is a small hole about .3m deep, filled with stones, dug in the trench floor to drain off rain water. If the trench is dug on a slope, a catchwater drain should be dug uphill of the trench to divert the run off.

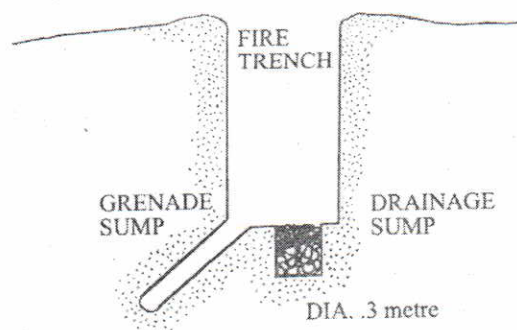


Figure 8-3-4 Drainage Sump

- d. Stage 4 - Revetting. Supporting walls are called "revetment". In normal soils the walls of trenches must be revetted to prevent cave-ins. Revetting adds strength and stability to your



trench making it less vulnerable to near misses which could collapse the walls of a non-revetted trench. Sheets of corrugated iron are supported against the walls of the trench with 3 m pickets. They are further strengthened when wired to smaller 1 m pickets driven into the ground around the edges of your fire trench.

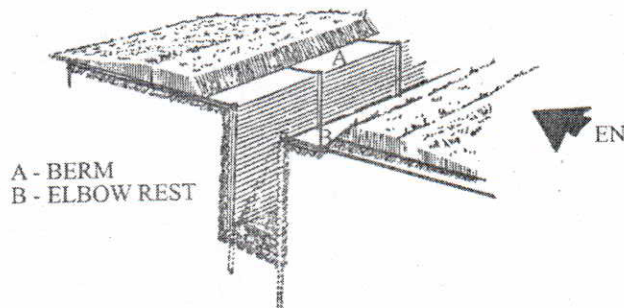


Figure 8-3-5 Revetting

- e. Stage 5 - Overhead Protection (OHP). OHP must be provided either over the main trench, or a separate 1.4 m shelter trench. Any sturdy material can be used to construct your OHP. When using timber or boards, ensure they are strong enough to support the weight of a minimum of 45cm of earth piled on top, plus the weight of at least one soldier. You must also consider some form of waterproofing for your shelter. Your shelter half or the plastic sheet from a SKOP kit can be spread over the OHP portion of your trench to provide a water barrier. Remember, whatever you use has to be camouflaged. If there are few local materials to work with then the SKOP kit can be used to construct up to 30cm of OHP. Just follow the directions in the kit and be sure to bury the anchors properly as they provide the necessary strength to support the weight of the soil.

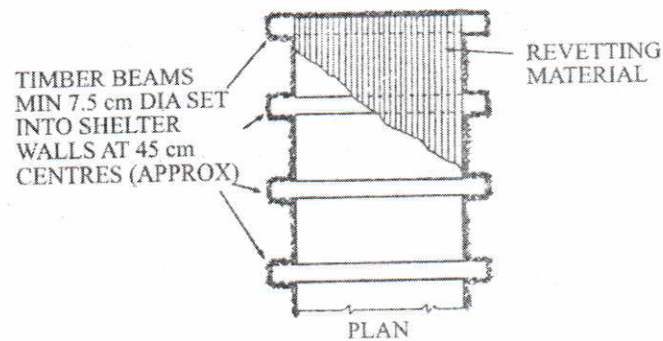


Figure 8-3-6 Trench Improvements

- f. Stage 6 - Improvements. Once Stages 1 to 5 have been completed, your trench is truly "combat ready". Now there is time to make it more habitable with a few improvements such as shelves, seats, sleeping ledges and a cooking area. These can be built by digging further into the sides of the trench and by utilizing any corrugated metal, logs, boards or discarded lumber.

#### CONCEALMENT OF OHP

7. The concealment of OHP is critical to ensure that your position will not be detected. Factors affecting concealment vary between open and close country. They are as follows:

- a. Close Country. A raised OHP can be placed over the fire trench since the resulting mound will not be difficult to camouflage in the woods. Openings at each end of the fire trench will give you the ability to fight in both directions and provide a protected means of entering and exiting the trench.

- b. Open Country. The OHP must be flush with the ground to conceal the location of the trench. The OHP is dug adjacent to the trench to form an "L", or as a straight extension of the trench. With the OHP below ground level the floor of the shelter trench will be lower than the adjacent fire trench by the same depth as the thickness of the OHP.

#### SPLIT HAIRPIN TRENCH

8. The split hairpin trench is an extended straight slit trench with overhead protection at one end. The trench can accommodate two soldiers, their weapons and equipment. The split hairpin trench uses preformed corrugated metal components which join together to form the OHP portion of the trench when stood upright and provide the revetment for the walls when placed sideways. The shelter bay can be located on either end of the trench.

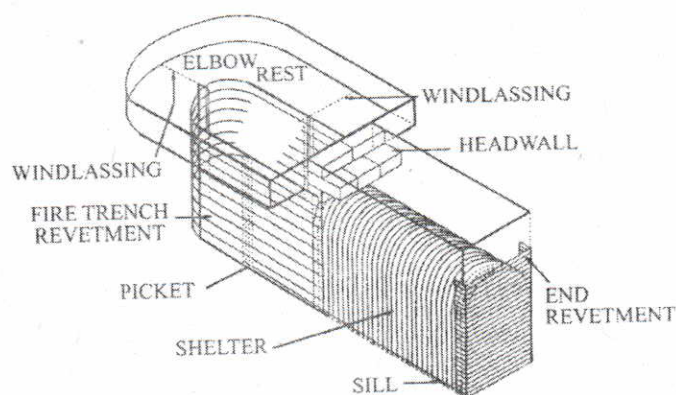


Figure 8-3-7 Split Hairpin Trench

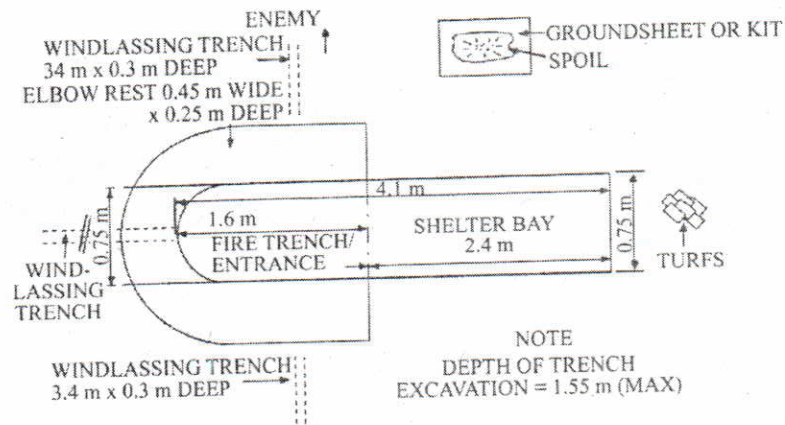


Figure 8-3-8 Excavation of Trench

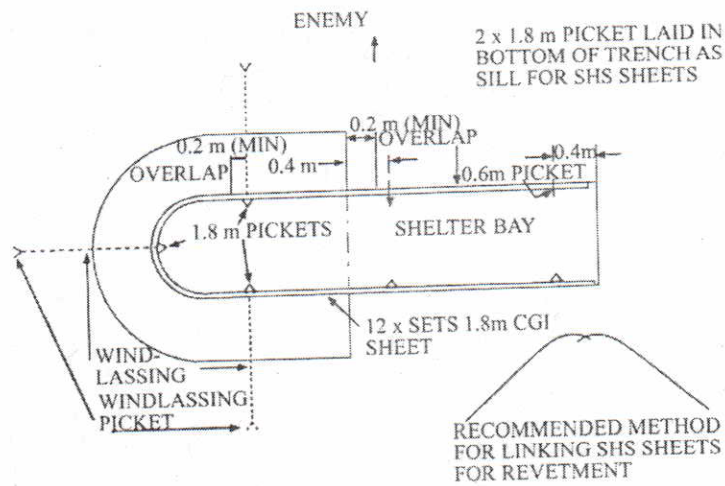


Figure 8-3-9 Revetment of Trench

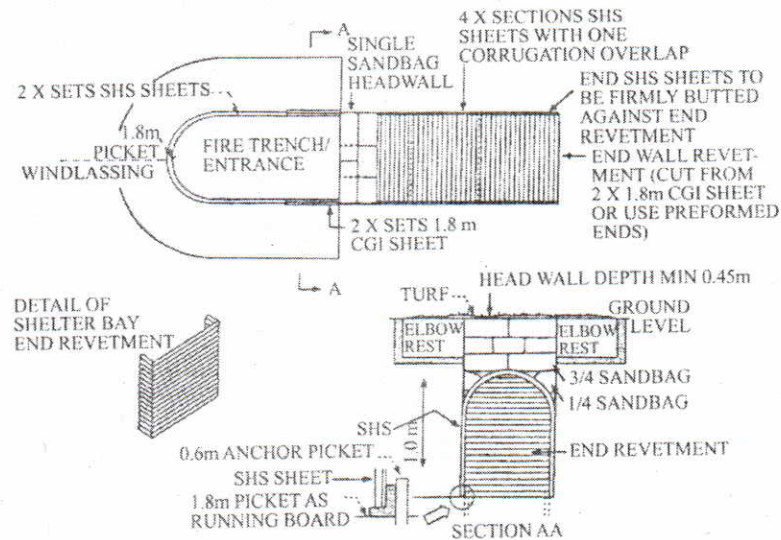


Figure 8-3-10 Shelter Bay Revetment and Headwall

### CAMOUFLAGING TRENCHES

9. Your ability to effectively blend the trench into its surroundings can save your life. If it cannot be detected by the enemy it will probably not draw directed fire. The following points must be considered when you are camouflaging your trench:

- a. Siting. Positioning the trench to foil observation from the ground and air is the first and most important aspect of camouflage. Whenever possible, trenches should be sited under trees.
- b. Cover. It is important that the cover concealing your trench is not an isolated feature. A lone tree or shrub or solitary



structure is a conspicuous hiding place and may draw fire whether the enemy sees anything or not. When natural cover is not available, camouflage nets are used to prevent detection. Natural local vegetation is preferred; however, if used it must be replaced before it wilts.

- c. Spoil. To maintain the natural look of the terrain, spoil should be removed and spread out inconspicuously or camouflaged. This will eliminate accumulations which indicate where excavation has occurred.

10. When camouflaging, you must employ methods to disrupt the factors of the 11 reasons of why things we see things. They are shape, shine, silhouette, shadow, spacing, scale, position, colour, noise, movement and texture. Use a combination of natural and man-made materials to blend the trench into its surroundings. Remember, as long as they don't suspect that you are in a given location, they won't investigate it fully.





"HERE COMES THE BOOT,  
I DON'T THINK HE LIKES OUR":  
-ABILITY TO EMPLOY OUR WEAPONS;  
-DEGREE OF PROTECTION;  
-SPEED OF CONSTRUCTION; OR  
-CONCEALMENT.

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## SECTION 4

### SHELTERS

#### GENERAL

1. The manner of building shelters described in this section are not laid down as hard and fast rules that you must follow. As these are improvised shelters, using the shelter-halves and equipment that a soldier is normally issued, the recommended methods are only a guide for you to follow. The type and shape of the shelter that you build will depend on the natural material available at the time, the type and condition of the terrain and your own imagination and initiative.

2. Siting of Shelters. The following must be taken into consideration when siting your shelter:

- a. shelters must not be sited on a likely enemy approach;
- b. the direction of the prevailing wind must be considered because blowing sand/ snow always drifts in the lee of obstacles; and
- c. shelters should be sited in a location which provides the best natural camouflage from enemy ground observation and which will result in the least amount of disturbance to the surrounding foliage.

3. Shelters can be built in wooded areas, open country and barren areas. Wooded areas are preferred because they provide timber for building, wood for fires, cover from air and ground observation and a natural windbreak.

#### THE CANOPY

4. The canopy provides overhead protection but remains open on the sides:

- a. attach a cord to each corner and to webbed tabs; and
- b. suspend the canopy from a branch and secure to the ground at the four corners.

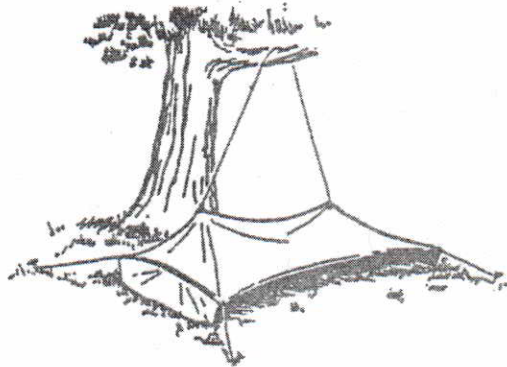


Figure 8-4-1 Canopy

#### ONE-MAN LEAN-TO

5. The one-man lean-to provides effective protection against wind and rain by keeping the slope of the lean-to facing the prevailing wind and as low as possible:

- a. using a long pole or cord, secure the shelter half between two trees;
- b. secure the other end to the ground using pegs or branches;
- c. secure the flaps to the ground to provide side walls.

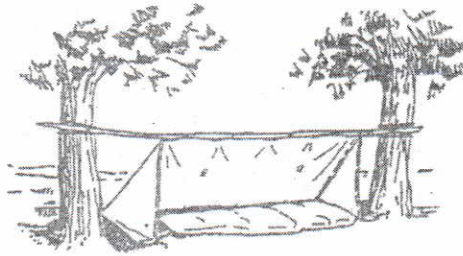


Figure 8-4-2 One-Man Lean-To

#### TWO-MAN CANOPY

6. The two-man canopy can provide effective temporary shelter, with open sides to provide maximum ventilation:

- a. secure a pole or cord between two trees;
- b. join two shelter halves and drape them over the pole lengthwise;
- c. secure one end to the ground;
- d. tuck in end flaps; and
- e. support the free end with two upright poles and cord.

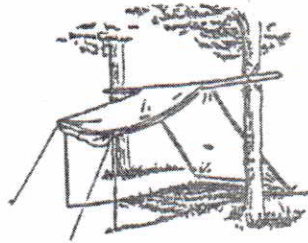


Figure 8-4-3 Two-Man Canopy

#### TWO-MAN SHELTER

7. The two man shelter provides the most effective protection from the elements:

- a. join two shelter halves ensuring that the zipper is covered by the flap and oriented to allow water to run off;
- b. secure the apex between two trees, using cord, at about waist height. Where no trees are available, two short poles are required;
- c. secure the sides of the shelter to the ground using pegs or sticks;
- d. secure the web flaps to branches or trees to enlarge the inside area; and
- e. tie end flaps together.



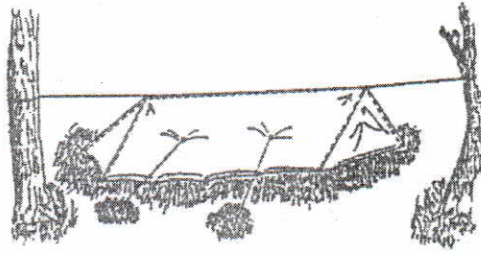


Figure 8-4-4 Two-Man Shelter

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## SECTION 5

## HYGIENE AND SANITATION IN THE FIELD

## PERSONAL HYGIENE AND SANITATION

1. To stay healthy when working in a field environment, you must wash on a daily basis. This is normally done in the evening prior to going to bed or during breaks in the action. Mobile field bath units may be available to you, or you may have to utilize a lake or stream. When using existing bodies of water, care must be taken to ensure that you bathe downstream from any water point if this same source of water is to be used for drinking purposes. In the event that you are in an area without available fresh water and there is no bath unit heading your way, then the time honoured "Bird Bath" using your wash basin or helmet will have to suffice. Regardless of the circumstances, you must wash daily.

2. As a minimum the following parts of the body must be cleaned:

a. the face:

- (1) remove cam paint with soap and water;
- (2) scrub off all dirt and sweat; and
- (3) clean the ears thoroughly;

b. the hands:

- (1) scrub dirt and cam paint from the skin; and
- (2) clean and trim fingernails to prevent bacterial contamination;

c. the groin:

- (1) wash the genital area thoroughly with soap and water to prevent infection;
- (2) apply talc to the inside of the thighs to prevent chafing;
- (3) change undergarments daily; and
- (4) change sanitary napkins often in hot, humid conditions or when contaminated by submersion in stagnant water;

d. the feet:

- (1) wash with soap and water, dry thoroughly and when possible allow your feet to air out;
- (2) clean and trim the toenails; and
- (3) apply foot powder and put on fresh socks; and

e. body hair:

- (1) wash head, armpit and pubic hair thoroughly to prevent infestation;
- (2) keep your hair cut short; and
- (3) shave facial hair daily with clean water and a fresh razor.

**CLOTHING AND EQUIPMENT**

3. Your combat uniform and equipment must be kept clean and be properly cared for if they are to serve you as required:

a. combat clothing:

- (1) clean regularly using hot soapy water. Rinse thoroughly, then allow to air dry. Combat clothing can be effectively cleaned in a wash basin or helmet; and
- (2) repair cuts or tears at the earliest opportunity;

b. plates, cups, utensils and canteen:

- (1) wash in hot soapy water;
- (2) rinse in clean, disinfected water; and
- (3) dry thoroughly and keep them covered when not in use;

c. boots:

- (1) clean in cool, soapy water;
- (2) rinse thoroughly;
- (3) allow to air dry, out of direct sunlight, prior to applying silicone treatment; and
- (4) clean or replace insoles as required.

#### HEALTH

4. In order to stay healthy while living under field conditions follow these basic rules:

- a. keep fit to maintain a robust physique and to prevent injury;
- b. drink plenty of fluids to prevent heat exhaustion;
- c. eat a balanced diet to provide energy and to maintain stamina;

- d. develop a healthy attitude through hard work and cooperation with others;
  - e. always wash your hands after urinating or defecating; and
  - f. use sun block to protect your exposed face and neck.
5. Illness can be prevented by your steadfast adherence to the following basic rules:
- a. use the latrines. Do not urinate or defecate on the ground as this provides a breeding ground for disease carrying insects;
  - b. always bag your garbage and move it to the pick up point. Unattended refuse attracts foraging animals and rodents;
  - c. dispose of washing and shaving water using only approved sumps. Dirty (grey) water attracts insects; and
  - d. keep food out of your bivouac area. Food scraps attract bears, raccoons, rodents and insects.

#### FIELD SANITATION APPLIANCES

6. When moving into any area for an extended stay, field sanitation appliances must be constructed to provide you with the field version of a bathroom. During peace time, environmental precautions must be taken to prevent contaminating the ground with waste water. All "grey water" will be removed in suitably marked containers. Other aids to field sanitation are:

- a. improvised wash racks can be constructed between two trees approximately 2 m apart. Two poles are lashed to the trees, approximately 1.2 m off the ground, one on either side, using wire or rope. An additional pole is lashed approximately 1.5 m off the ground to suspend mirrors, towels, etc. A water tight container or an approved sump is prepared close by for disposal of dirty water;



- b. clotheslines can be constructed anywhere in your bivouac area. Secure signal wire or rope between two trees approximately 1 m off the ground. Attach mine tape to the line and the trees so that it can be easily identified at night;
- c. when hot meals are provided, eating utensil wash up points will be prepared close to feeding areas and will provide you with hot soapy water, a hot rinse and a cold disinfectant rinse; and
- d. where permitted, wash water sumps will be dug into the ground approximately one metre deep, partially filled with loose gravel, then securely covered with a hessian or fine wire mesh. This ensures proper straining of the wash water and reduces insect infestation.

### INSECTS

7. When in the field you will encounter many different types of insects. They will range in size from the tiny mite to larger biting flies. You must be able to identify them and the stings or bites that they are capable of inflicting:

- a. mosquitoes are commonly found in damp, grassy areas. Their persistent attacks can be countered with a mosquito net covering the face, by covering all other exposed skin and by applying a non perfumed repellent to the skin and clothing.

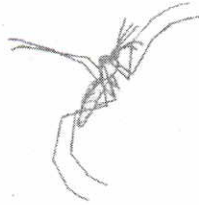


Figure 8-5-1 Mosquitoes

- b. fleas are found in abundant varieties in all parts of the world. Sand fleas will infest your clothing as you come in contact with the ground. Other types are carried by rodents and can infest your sleeping area as they forage for food. The use of insect repellents along with frequent laundering of clothing and sleeping bags will control them.

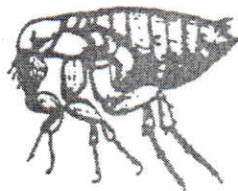


Figure 8-5-2 Fleas

- c. head lice normally attach themselves to the hair close to the scalp. Their eggs are attached directly to the hairs of the head. Crab lice usually attach themselves and their eggs to the hairs of the body or the groin area. Use of insect repellent and disinfectant powders along with an effective program of personal hygiene can prevent infestation.

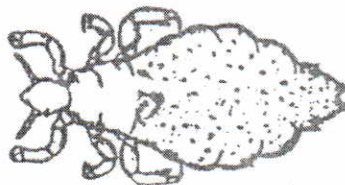


Figure 8-5-3 Head Lice

- d. common body lice are usually found in the seams of clothing with their eggs attached to individual fibres. The louse generally remains on the clothing except during actual feeding, at which time it moves to the skin of the infested person.

Frequent laundering and changing of clothes, followed by bathing and application of insect repellents and disinfectant powders will prevent infestation.

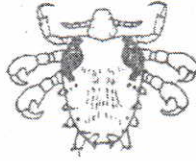


Figure 8-5-4 Common Body Lice

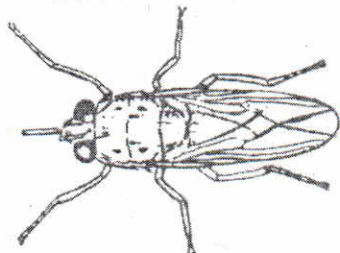
- e. ticks and mites normally infest wood lots or grassy tracts within a confined area therefore, the most effective prevention of their bite is to avoid such areas. Some ticks carry diseases which can produce sickness and high fever. To reduce the chances of being bitten by a tick, ensure that your combat trousers are tucked into your boots, apply an insect repellent to your skin and clothing and always maintain a high standard of personal hygiene.



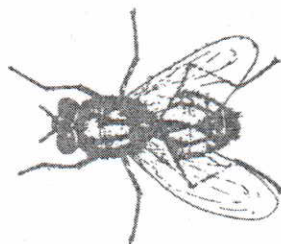
Figure 8-5-5 Ticks and Mites

- f. biting and non-biting flies can be found in many regions of the world. They pose a major health problem for personnel. Special precautions such as wearing mosquito netting around the head and regularly using a mosquito net at night may be required. You must take measures to protect any food from exposure to swarming flies. Never leave your meal open to the air unattended and eat it immediately. Strict adherence to

garbage disposal and cleaning of latrines and sumps will reduce the chance of fly borne diseases.



Biting Flies



Non-Biting Flies

Figure 8-5-6 Biting and Non-Biting Flies

## SECTION 6

### OPERATING IN COLD WEATHER

#### GENERAL

1. Canadians are subjected to cold, wet weather and severe winter conditions for approximately one third of each year. Surprisingly, only a small percentage of Canadians have truly learned how to survive prolonged exposure to these conditions without suffering measurable effects. It is likely, during your career, that you will be involved in various training or operations, that will take place during winter or arctic conditions.

2. Cold weather and winter conditions are a neutral force in nature, they favour neither you or the enemy. It is essential to your survival and effectiveness as a soldier that you know how to work in winter conditions and understand the effects of cold weather on your body.

#### COLD WEATHER CLOTHING

3. The human body can be compared to a constantly running furnace, which, to run efficiently, must always maintain a certain temperature. The food you eat is your fuel, which turns into heat to maintain your normal body temperature. Just as a furnace gives off heat to the surrounding air, so does your body. During cold weather you lose more heat more quickly. This means that you must "wall-in" the heat next to your body, because when heat leaves the body you become cold.

4. Your clothing acts as an insulator, preventing body heat from escaping to the outside air. Some types of clothing are better insulators than others. For example, a wool sweater is one of the best because air, an excellent insulator, is pocketed in thousands of tiny air cells between the fibres. Another good insulator is fur because air is trapped in the hair when it is kept close to the body.



5. Cold weather clothing is designed not only to reduce your heat loss but also, through ventilation, to prevent you from becoming overheated. When you are overheated you perspire and this fills the air spaces with moisture, reducing the insulating qualities of the clothing. Moreover, when perspiration evaporates, it not only robs clothing of its insulating value, but it chills the body.

6. The rule of wearing clothing loose and in layers also applies to footwear. The layers are made up by the boot itself and different combinations of socks and insoles. Care must be taken not to restrict circulation. Two or more socks, worn too tightly, might easily mean freezing your feet. For the same reason, avoid lacing the footwear too tightly.

7. The rule about avoiding overheating and keeping dry are often difficult to follow as far as the feet are concerned. Footgear is more often subjected to wetting than are other items of equipment, but is designed to decrease this disadvantage as much as possible. A dry change of socks must be carried at all times. Whenever the feet get wet, socks must be changed immediately. When wearing mukluks, both socks and insoles must be changed as soon as they become wet. Footgear must be dried at the first opportunity and be kept clean. Socks and feet should be washed frequently. This washing will help keep the feet and socks in good condition. The effects of wet and cold feet drastically reduce your ability to concentrate on your duties. In extreme cold conditions, a change of socks is like a day on leave.

8. The winter clothing provided by the Canadian Forces is among the best available in the world; however, you must wear it as intended and you must insist on having it fit correctly.



**PRINCIPLES OF KEEPING WARM**

9. The principles of keeping warm can be remembered with the acronym "COLD":

- C - clean clothing;
- O - overheating must be avoided;
- L - loose and layered clothing; and
- D - dry clothing.

- a. Clean Clothing. This is important from a standpoint of both sanitation and comfort. Dirt and grease will mat clothing and fill the air pockets. It is very important to change and clean your underwear as often as possible.
- b. Overheating must be avoided. To stay warm, avoid getting hot. Overheating causes perspiration, this causes clothing to become damp as the perspiration fills the air holes in the clothing with heat-conducting moisture, permitting the body heat to escape. Another reason for avoiding overheating is that when perspiration evaporates, your body will cool faster. Overheating can be prevented by ventilation, partially open parka or jacket, or by removing layers of clothing. In cold weather, it is better to be slightly chilly than too warm. One of the cardinal rules of cold weather operations is not to RUN unless you absolutely have to.
- c. Loose and in Layers. Clothing and footwear that is too tight restricts the blood circulation, increasing the danger of frost-bite. On the other hand, clothing must not be worn too loose; this will allow movement of the trapped air between the layers of clothing, resulting in heat loss.
- d. Dry Clothing. Moisture will soak into your clothes from both inside and outside. Frost or snow that collects on your clothing will be melted by the heat you radiate or by the higher temperature encountered when you enter heated shelters.

Brush or shake off all snow and frost before entering shelters. Even in the coldest weather you cannot entirely avoid perspiring.

10. Take advantage of each and every opportunity to dry out your clothes. To dry out wet clothing, carry out the following:

- a. handle each piece separately;
- b. do not hang things directly above the stove or heat source, they may fall and catch fire;
- c. do not place anything too close to a stove or hot pipes. Nylon melts easily and wool quickly becomes scorched; and
- d. do not hang clothes over steaming pots.

11. To dry out damp clothing carry out the following:

- a. hang damp clothes on the outside of your rucksack, to dry on the march. Crumple them and shake, or snap them vigorously, before wearing; and
- b. do not place damp clothing in your sleeping bag to dry. This only transfers moisture from your damp clothing into the down of your sleeping bag.

#### **COLD WEATHER HEALTH RULES**

12. Cold weather is healthy weather, if you know how to look after your body when the temperature drops below freezing. The rules of hygiene and sanitation that you have already been taught apply, with a few common sense modifications to cold weather living. Following a regimen of staying clean and dry at all times will measurably increase your comfort and good health.

### HEALTH RULES FOR EATING

13. It is important to remember that when you eat a big meal, your stomach goes to work to process the food. This creates as much body heat as taking a long brisk walk. Don't waste body energy, do the following:

- a. eat your fill of frequent hot meals, drinks, candy, and dried fruit while on the march;
- b. eat a fourth meal whenever possible;
- c. save snacks (cookies, chocolate bars, etc.) for between meals; and
- d. prepare haversack lunches for meals to be eaten on the move.

### EFFECTS OF THE COLD

14. In extreme cold conditions, you will become indifferent to nonessential tasks. As a result, essential tasks will require more time and effort. It has been repeatedly demonstrated that at temperatures lower than  $-23^{\circ}\text{C}$ , all other problems and requirements lose significance in the soldier's personal battle for survival. The destructive influence of cold on the human body falls into two categories:

- a. General hypothermia. This is an injury set on by cold to the entire body, either from immersion or exposure. Prolonged exposure will result in death; and
- b. Local hypothermia. This refers to cold injuries to specific areas of the body that destroy tissue and result in gangrene and death, unless proper medical care is received.

15. It can generally be expected that exposure to the extremes of cold will aggravate or intensify the effects of any physical disorder with which you are affected at the time of initial exposure.

## AVOIDING COLD INJURIES

### 16. Safety tips to avoid cold injuries:

- a. Stay Warm. Wear clothing that retains body heat without causing sweating. Several layers of loose fitting clothing have a greater protective value than one thick item of constrictive clothing. Keep the head covered to prevent heat loss;
- b. Stay Dry. Avoid getting wet, even from sweating. Any moisture on the skin increases loss of body heat by evaporation, and wet clothing has little insulating value;
- c. Stay Safe. Limit the time spent in the cold and stay with a partner so that you can check each other for signs of frostbite and hypothermia. This is called the buddy system; and
- d. Eat Well. Eat raisins, nuts and other easily converted high energy foods at regular intervals.

17. Avoid fatigue and the use of tobacco and alcohol. These contribute to heat loss and increase the chances of cold injury. Consuming even moderate quantities of alcohol or other intoxicants, when in an extremely cold environment, can be your DEATH SENTENCE. They will give you an initial sense of euphoria, but drastically lower your guard against the cold, which remains constant. You may fall asleep and never wake up.

### FROST-BITE

18. Frost-bite is the freezing of various parts of the body. There are two types of frost-bite. The first is superficial frost-bite, where only the skin is frozen. This attacks commonly exposed parts of the body such as ears, nose, wrists, cheeks, chin and forehead. The second is deep frost-bite, where the freezing penetrates deeper into the skin through to the bone and usually shows up as a much larger patch of affected area. The affected area will show up as a patch of stiff, numb skin, white or yellow in appearance. Frost-bitten areas can be treated by



warming the affected area with the body heat from your hand, until the symptoms disappear. **DO NOT RUB FROST-BITTEN AREAS.** If you have developed frost-bite, take the hint and address your shortcomings in protecting yourself from the cold. If blisters develop, seek medical attention.

19. Deep frost-bite will not respond to warming by the hand, and the casualty should be immediately evacuated to a heated shelter. Once inside a shelter remove constricting clothing and administer only gradual thawing using warm body parts or warm air. Do not expose the part to rapid heating. This should be followed immediately by a visit to the Medical Officer. Severe frost-bite may result in the permanent loss of the affected area.

20. Prevention of frost-bite is realized through vigilance by you and your buddy. You must constantly inspect the exposed areas to detect the onset of frost-bite. Wear sufficient clothing in order to maintain body heat, stay dry, and maintain circulation. Do not touch bare metal with bare skin at low temperatures and exercise the face, fingers and toes to keep them warm and detect any numb areas.

#### **IMMERSION FOOT (TRENCH FOOT)**

21. Immersion foot is an injury resulting from prolonged exposure to cold damp conditions, near or slightly above the freezing point. Symptoms include feet and toes which are pale, feel stiff, cold and numb. Walking becomes difficult.

22. Since the symptoms are not painful they may go unnoticed, therefore prevention becomes more important. Check feet often when operating in cold wet conditions. Feet should be dried as soon as possible, after becoming wet. If it is necessary to wear wet socks and boots, wriggle the toes and bend the ankles to promote circulation. Do not wear tight boots.

23. Treatment for immersion foot, is to gently rub or massage the feet. If necessary wash with soap and water, dry and keep elevated. Keep the feet cool by exposing them to room temperature only.

8-6-8

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CHAPTER 9

BATTLECRAFT

SECTION 1

TACTICAL FIELD SIGNALS AND SECTION FORMATIONS

TACTICAL FIELD SIGNALS

1. There are seven basic tactical signals with which a section commander can control the movement of the section members. The meaning for each tactical signal must be clearly understood by every soldier to ensure rapid action within the section. It is the responsibility of each soldier to watch for and pass these tactical signals on, and to ensure that each new signal is understood by the soldier you pass them to:

- a. Advance. The advance is used to move the section forward from a start point, or to indicate continued movement after a halt. The arm is partially or fully extended and swung over the head from the rear to the front.



Figure 9-1-1 The Advance

- b. Halt. The halt is used to stop the forward movement of the section. The arm is bent at the elbow with the palm facing forward and the hand in line with the shoulders or above the head.



Figure 9-1-2 The Halt

- c. Open Out. This signal when used, will have members of the section increase their interval because they were too close or the ground is suitable for increased spacing. The arms are extended in front of the body or above the head with the palms open, facing outwards. The arms are moved apart several times.



Figure 9-1-3 Open Out

- d. Close Up. This signal is used to move members of the section closer together due to the changes in terrain or because the spacing was too great. The arms are extended in front of the body or above the head, palms are open, facing inwards. The arms are moved together several times.



Figure 9-1-4 Close Up

- e. Speed Up. The speed up signal is used to increase the pace of the section or a particular member. The arm is held at the waist, fist clenched and the hand is moved rapidly up and down several times.



Figure 9-1-5 Speed Up

- f. Slow Down. The slow down signal is used to reduce the speed of the section when it is moving too fast. The arm is held at the waist with the palm down and moved slowly up and down several times.



Figure 9-1-6 Slow Down



- g. Turn About. This signal is used to turn the section around and move it in a new direction. The arm is bent at the elbow with a clenched fist at shoulder level and a large circular movement is made in a clock-wise manner. The hand will then be pointed in the direction to be followed.



Figure 9-1-7 Turn About

#### FORMATION SIGNALS

2. There are six formation signals with which the section commander can control the formation of the section to meet the tactical situation or to adjust to the terrain. The noise of battle will make control of the section difficult when using verbal commands; therefore, a series of easily understood hand signals provides reliable communication:



- a. Single File. The signal for this formation is the arm swung over the head in a small arc, with hand open and extended.



Figure 9-1-8 Single File

- b. Loose File. The signal for adopting this formation is both arms bent at the elbow, with clenched fists extended above the head.



Figure 9-1-9 Loose File  
9-1-7

- c. Arrowhead. The signal for this formation is both arms extended to the side and rear on a 45 degree angle.



Figure 9-1-10 Arrowhead

- d. Spearhead. The signal for adopting this formation is identical to that of the arrowhead and is accompanied by the verbal command "Spearhead".



Figure 9-1-11 Spearhead

- e. Diamond. The signal for adopting this formation is the arms above the head with hands joined to form a diamond.



Figure 9-1-12 Diamond

- f. Extended Line. The signal for adopting this formation is both arms outstretched in line with the shoulders.



Figure 9-1-13 Extended Line

## SECTION FORMATIONS

3. There are six section formations; single file, loose file, arrowhead, spearhead, extended line and diamond. Any military unit moving on foot within an area of tactical operations must be capable of adopting formations appropriate to allow swift movement over various types of terrain and to provide protection against enemy small arms fire. Your section commander will select the formation most appropriate to the tactical situation and the ground over which you must move. Your job is to be alert for signals passed from the section commander and to move into your position within any field formation as quickly as you can:

- a. Single File. This formation is useful for control when the likelihood of enemy contact is minimal or when following linear features such as hedges, ditches, walls and trails. This formation provides maximum fire power to the flanks, facilitates control and movement and is commonly used in dense terrain and reduced visibility. It provides limited fire power to the front and rear.

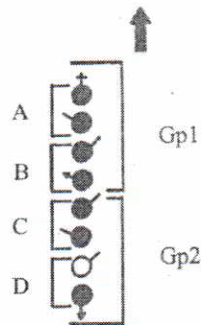


Figure 9-1-14 Single File Formation



- b. Extended Line. This formation is the basic assault formation of the section and provides for the delivery of maximum fire to the front. This is the most difficult formation to control and is vulnerable to flanking enfilade fire. It is the best formation for crossing open ground under fire and for crossing roads or gaps in hedgerows when fire is anticipated. You must concentrate your attention toward the section's front and remain alert for signals.

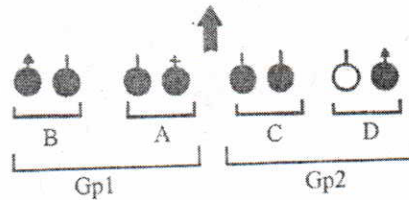


Figure 9-1-15 Extended Line Formation

- c. Arrowhead. This formation allows an effective volume of fire to the front. It is less vulnerable to frontal fire and is most commonly used when crossing open ground or when the enemy situation is obscure. The formation provides for good all around protection, but is vulnerable to enfilade fire. Control can be more difficult than with other formations; therefore you must be aware of your position in the arrowhead and maintain it.

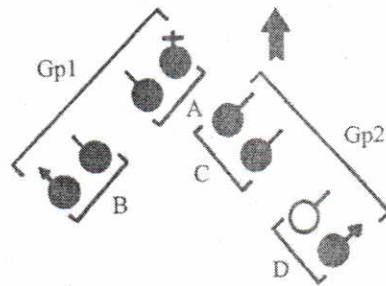


Figure 9-1-16 Arrowhead Formation

- d. Spearhead. In this formation, the rifle group adopts the arrowhead led by the section commander with team Delta behind the base of the arrowhead. This formation is easy to control and presents shorter flanks than the arrowhead. It presents a slightly more vulnerable target than the arrowhead and is not quite as effective for producing immediate fire. Opportunities for using this formation are limited but it may be adopted when moving across open country where bushes may restrict movement and dispersal or at night when the diamond is not used.

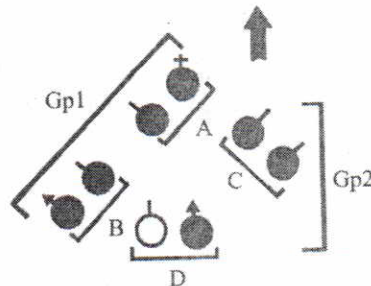


Figure 9-1-17 Spearhead Formation



- e. Diamond. This formation facilitates control and it is less vulnerable to enfilade fire providing good all round fire and observation. It is vulnerable to frontal fire and does not provide effective fire production to the front. It is used only when crossing open ground at night and must not be used when arrowhead can be adopted. Each soldier in your formation must be able to see the next soldier. Your section commander may be positioned either at the front or in the centre of the formation, dependent solely on the need for control.

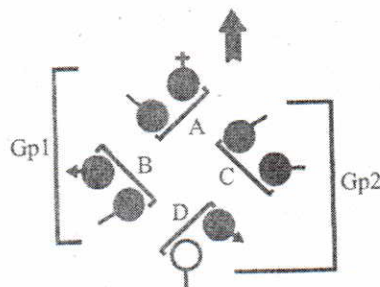


Figure 9-1-18 Diamond Formation

- f. Loose File. This formation aids your section commander in controlling the section while operating in close country and presents a less concentrated target from the front. It is useful at night and provides for good control. The section can deliver a large volume of fire to the flanks but only a limited amount to the front and rear; however, it still provides good all around protection.

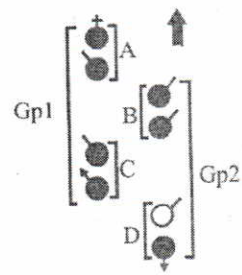


Figure 9-1-19 Loose File Formation

## SECTION 2

## SCOUTING AND MOVEMENT

## SCOUTING TECHNIQUES

1. When assigned scouting duties, your aim is to see without being seen. It is your responsibility to be the eyes and ears of your platoon/troop commander and to ensure the security of your unit when on the move. When scouting for your unit, you must remain alert for signs of enemy activity and be cautious not to give yourself away through careless action.
2. Remember, it is not your job to engage the enemy; therefore, you should use your rifle only in self defence or in the defence of other soldiers. You may bring fire to bear on the enemy from your position if the platoon is under effective fire.
3. Scouts work in pairs and move forward by bounds. When a position for the next bound has been selected, one of the pair chooses a route to it and moves forward as rapidly as possible while the other observes. Once the first scout reaches this bound and searches the area to the front, the second scout is signalled to come forward. The process is repeated for as long as is required.
4. The technique of moving forward by bounds allows you to:
  - a. cover the advance of the leading scout with fire and help them to withdraw if surprised by the enemy; and
  - b. if the leading scout gets into difficulties, the other can inform the section commander in time to take action.

## MOVEMENT

5. The Scout must take the following into consideration during movement:

- a. scouts move by a series of tactical bounds. A bound is defined as movement from one point of observation and cover to another. The length of a bound will depend on the ground to be crossed and the speed at which your unit is travelling;
- b. you must move using stealth, walking or running briskly between positions, always mindful of your surroundings;
- c. you may be required to check the path for mines, tripwires or booby traps;
- d. you must check all likely places where an enemy could be concealed including windows, roofs and treetops;
- e. you must take care not to miss an enemy ambush position which would allow you to pass in order to strike at the main body of your unit;
- f. bounds must not be so long that communication is lost with those trailing you.

6. Depending on the required speed, enemy threat and the terrain through which you are travelling, you will have three methods of scouting to choose from:

- a. Caterpillar Technique. The lead scout selects the next position and quickly moves forward covered by the second scout. Once in position, the first scout observes the ground to the front and flanks, then signals the second scout to move forward but not past the first scout. Once the second scout has moved into a fire position the process is repeated. This method is the slowest of the three but is very effective at ensuring security for the main body.

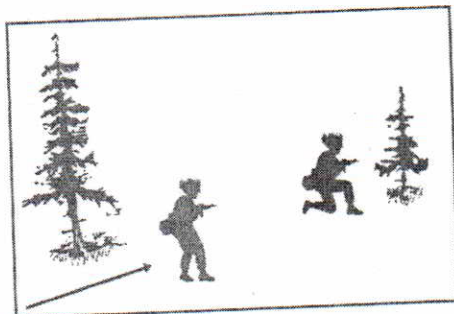


Figure 9-2-1 Caterpillar Technique

- b. Leap Frog Technique. The first scout moves one tactical bound, takes up a position of observation and fire, observes the ground to the front and flanks, then provides cover for the second scout. The second scout will move forward upon seeing the signal from the first scout. The second scout will move one tactical bound past the first scout to a position of observation and fire, observe, then signal the first scout forward. Upon seeing the signal from the second scout, the first scout will move one tactical bound past the second scout repeating the process. This method is faster than the caterpillar method allowing the scouts to travel longer bounds.

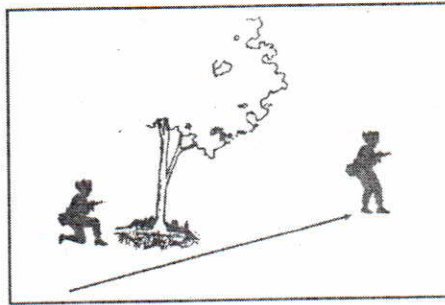


Figure 9-2-2 Leapfrog Technique

- c. Trailer Technique. The first and second scout travel at the same time. The scouts will work as a team walking cautiously with rifles at the ready, moving their head and rifle simultaneously in the same direction observing (scanning) the ground to their front. The rear scout will walk one bound behind the lead scout in order to maintain passage of information to the section commander. The trailer method is the fastest scouting technique but does not provide the same degree of security as the leap frog and caterpillar. The trailer is most effective during rapid advance in open country where the possibility of close-in surprise by the enemy is minimal.

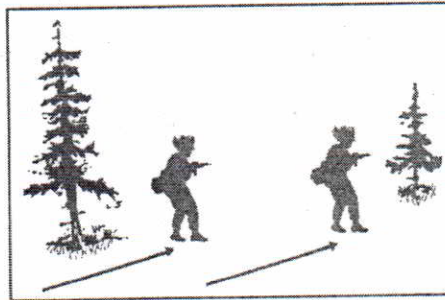


Figure 9-2-3 Trailer Technique



**STEALTH**

7. Every soldier must have the ability to move without being seen or heard. During many operations you will be able to take advantage of the background noise and smoke that pervades the battlefield. At other times you will need to move silently and remain invisible to the enemy. With the wide spread use of surveillance devices, your task becomes more difficult yet you must keep in mind that not every enemy soldier will have an image intensifying device on their weapon and that stealth is still a valued tool of the soldier.

**NIGHT MOVEMENT**

8. Night movement requires the same attention to stealth and concealment as movement during the day. Three methods are employed.

9. Ghost walk. When moving at night, your ability to see fine detail on the ground is very limited, therefore:

- a. you must be able to walk without stepping on debris which could give your movement away;
- b. you must develop a keen sense of balance even while wearing web gear and carrying a weapon;
- c. the weapon is carried by the pistol grip while the free hand is used to sweep the area in front of the face, chest and knees to check for branches, wire or any obstruction which can hamper movement or create noise.

10. The ghost walk is a variation of the normal walk but with a few refinements:

- a. the legs are alternately lifted high and straight up to avoid long grass;

- b. the leg in motion is swung outward and as the foot is lowered gently to the ground the toes are used to feel for a safe spot to step;
- c. as the sole of the boot makes contact with the ground, your weight is gradually shifted forward while slowly moving the foot back and forth to allow it to settle in;
- d. the knees are slightly bent but the back should remain straight to reduce fatigue; and
- e. this method can be used during daylight when the reduction of noise is critical.

11. Cat Walk. When moving close to the enemy it will be necessary to remain low and reduce noise to an absolute minimum. The cat walk can be performed at night by crawling on your hands and knees. The ground ahead of you is swept clean of sticks or debris with the left hand while the rifle is carried in the right. When the area has been cleared of noise causing materials, you crawl forward very slowly through the area just cleared ensuring that you do not drag your hands and knees. Once you reach the forward edge of the cleared area you repeat the process.

12. Kitten Crawl. When in very close proximity to the enemy at night, the kitten crawl is a technique used to move about without being seen or heard. This movement is very tiring and should not be performed over long distances. While keeping your head and heels low, slowly reach out with both hands and sweep the area to your front and sides for noise causing obstructions.

13. To move forward once the area has been cleared:

- a. lift your body with your forearms and push forward with your toes;
- b. gently lower your body to the ground; then

- c. continue repeating the process;
- d. your weapon is moved with the hand normally used to hold the pistol grip. This is done by picking it up and quietly placing it at your side on the ground. If the obstructions in your path are not too dense you may be able to carry the rifle by cradling it across your arms in the crook of your elbows.

#### ACTION ON FLARES

14. There are two types of flares that you must be familiar with when moving on the battlefield at night. The trip flare is designed to light up a small area and give early warning and is usually covered by observation and fire. The para flare is launched by hand or from mortars and artillery and is designed to light up a large area. You must instinctively react to both devices to minimize the chances of being seen.

15. Para Flare. When moving in the open, it is best to take cover or lie down the instant the light is seen. You must move quickly and remain absolutely still once you have gone to ground. If the launch of a para flare is in close proximity to your position you will hear it being fired. At the moment you determine that a flare has been launched you should seek cover and remain motionless until the light fades. Close your shooting eye as the flare descends and observe with the other eye. This will preserve your night vision in your shooting eye. In close country it is best to freeze and blend in with the surrounding brush. As a flare descends it causes shadows to move and flicker making it very difficult to distinguish objects within a tree line. Movement and shine will reveal your existence before anything else.

16. Trip Flare. These are usually placed in areas which are under enemy observation. If caught in the light of a trip flare, immediately close the shooting eye and quickly move out of the illuminated area to a reorganization point in accordance with your Standard Operating Procedures (SOP).

## DAY MOVEMENT

17. The application of stealth during daylight hours requires many hours of training and practice and depends on the proper application of fieldcraft, camouflage, individual movement, route selection and a highly disciplined attitude toward your mission.

18. Open Ground. Prior to moving through an open area, you must take the time to select your route. You must take advantage of gullies, ditches, streams, shrubbery, tall grass or drains and sewers. Take extra care when camouflaging yourself paying particular attention to your helmet, chest, back and the backs of your legs including your boots. The foliage you use to cover yourself must match the area you are about to cross. You may have to cross an area entirely on your stomach by performing the leopard crawl. You must move in slow rhythmic motions, avoiding sudden movements. You must keep your head and heels low to the ground ensuring that the camouflage attached to them does not appear unnatural. As you move, make use of small depressions in the ground and always avoid the crest of knolls. Make occasional listening stops and check your direction. Once on the other side of a clearing, move well into the brush before standing upright to resume your course.

19. Close Ground. When moving through brush, make sure that your camouflage always matches the surrounding foliage. Pay particular attention to the helmet, face, shoulders and back. You must totally break up the familiar outline of the human form to remain unseen. Before moving inspect the route ahead, scan your flanks and check to the rear. Move in bounds, weapon at the ready position pointing in the direction of observation as you constantly check your surroundings. Your motions must be smooth and swift, avoiding areas of tangled brush where possible. Step lightly with the outer edge of your sole touching the ground, then gently roll onto the sole of the boot and apply equal pressure as you shift your weight forward. At each bound stop and listen as you scan the ground for your next position.



**FIRE AND MOVEMENT**

20. When in contact with the enemy, fire and movement drills must be carried out instinctively to effectively execute tactical manoeuvre against enemy positions.

21. Selection of Fire Positions. Your selection of a fire position is not limited to the defence. Any time you and your unit are moving on foot against an unlocated enemy, you must anticipate possible fire positions as you walk. Should you come under attack you must instinctively move into a position of cover from fire, cover from view and from which you can return effective fire. The selection of good positions requires a knowledge both of the characteristics of your weapons and the use of ground. Remember, cover from view is not cover from fire.

22. Characteristics of Weapons. Knowing the characteristics of the weapons you carry will allow you to employ them effectively. You must also know enemy weapon characteristics and how the shape of the ground and available cover can alter their effectiveness.

23. Fire and movement is a technique where a designated group of a sub-unit brings fire to bear on the enemy, while the remainder moves to new fire positions. This is a continuing process with groups firing and alternately moving until the section or platoon is in position to assault. Fire against the enemy must be maintained and no group will move until that fire is effective.

24. There are five basic principles for fire and movement:

- a. control by the commander;
- b. speed and maintaining momentum;
- c. movement on exposed ground is reduced to a minimum unless there is effective covering fire;

- d. covering fire angle is as wide as possible without loss of time or control and must suppress the enemy's ability to return effective fire; and
- e. remain within specified boundaries during the assault and consider smoke.

25. Fire and movement is primarily a tactic of the infantry, yet any of you may at some time be forced to put up your own defence and mount a counter-attack to drive out an enemy who has gained a lodgement within your position. With this in mind, it must be clearly understood at what level the combination of fire and movement is taking place, who fires, who moves.

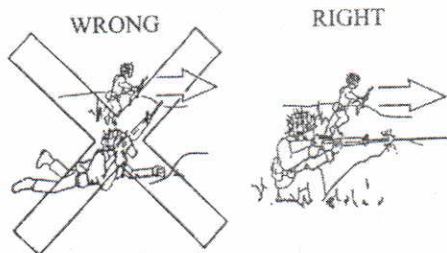


Figure 9-2-4 Fire and Movement



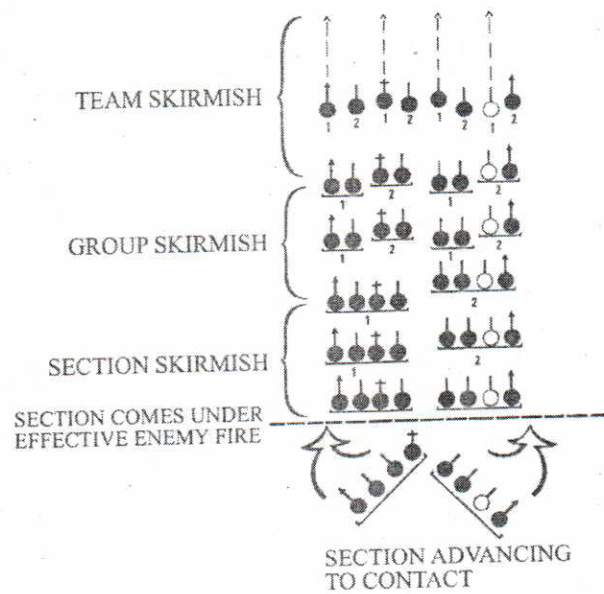


Figure 9-2-5 Skirmishing

**SKIRMISHING**

26. This is a method of using fire and movement to advance against an enemy while maintaining fire on his position. Sub-units are organized into two assault groups made up of two teams, with each team consisting of two soldiers. This aids in command and control since each section, group or team has a commander. The tactical movements are made in bounds usually not exceeding five or six paces when in close contact with the enemy. The skirmishing sequence is as follows:

- a. Section Skirmish. The section is controlled by the section commander, the section leap-frogs forward with one entire

group providing covering fire, while the other group moves to new positions.

- b. Group Skirmish. One group is controlled by the section commander while the other group is controlled by the 2IC, each group leap-frogs forward with one entire team providing covering fire while the other team moves to new positions.
- c. Team Skirmish. Each team is controlled by the team leader with one soldier providing covering fire while the other soldier moves to a new position.

#### OBSTACLE CROSSING

27. As you move about the battlefield, you will be confronted with various barriers to your progress. Some of these will have been constructed specifically to impede your movement while others will be natural obstacles.

28. The most commonly encountered obstacles are wire, walls, fences, ditches, streams, hedges and gaps. Since most man made obstacles are covered by fire, you must cross them as quickly as possible while offering minimal exposure to the enemy.

29. Obstacle crossing must be executed with teamwork and precision, requiring practice to achieve proficiency. Some obstacles are breached by assault pioneers or engineers using explosive ordinance such as prepared charges or bangalore torpedoes.

#### OBSTACLE CROSSING TECHNIQUE

30. Wire. Wire obstacles will be sited to prevent penetration and to channel you into a killing zone. If you encounter wire obstacles, the following must be considered:

- a. it should be crawled under, face up if possible. All kit and weapons must be secured tightly to the body to prevent snagging. When crossing as a team, the smallest members

snagging. When crossing as a team, the smallest members should go first to force a wider opening in the wire;

- b. an alternate method is to have one or two soldiers jump onto the wire face down while others run over their backs. This method only works with loose coils of wire and should never be attempted with wire that is windlassed to pickets;
- c. if you must cut the wire to gain passage then it must be held on both sides of the cut to avoid noise and injury from the flying ends;
- d. gaps left in wire obstacles are intended as lane ways for counter attack and as killing zones against attacking troops. Gaps are generally covered by machine guns and must be avoided; and
- e. low wire entanglements are very difficult to cross, especially if covered by enemy fire. Great care must be taken to provide effective supporting fire while crossing this type of obstacle as each soldier will be vulnerable and exposed.

31. Gates and Fences:

- a. the safest method of crossing is to crawl under a gate or fence if possible. This reduces the likelihood of being seen and fired at; and
- b. if it is not possible to crawl under then each soldier must jump or roll over the top. Speed, surprise and effective covering fire will reduce the risk and suppress the enemy long enough for you to get over the obstacle.

32. Walls:

- a. two man teams should be positioned at the base of the wall to boost the other members of the section to the top of the wall.

By squatting down they allow another soldier to step up on their shoulders, then stand to enable the soldier on top to reach the top of the wall. Alternately as each soldier reaches the wall, they step into the hands of the lifting team who boosts them up; and

- b. walls greater than three metres in height may require an additional team to remain on the top of a wall to assist in lifting the other members up. Upon surmounting the wall, personnel should roll across the top to keep their silhouette low and drop to the far side to provide cover for the remainder.

33. Ditches, Streams, Hedges, and Gaps. These areas can be very dangerous when covered by machine gun fire since troops tend to line up tightly against them.

- a. Prior to crossing any such area:

- (1) a quick reconnaissance must be carried out to check the far side for enemy positions; and
- (2) security teams armed with LMGs must be positioned on either flank of the crossing site to provide covering fire if necessary.

- b. If under direct observation by the enemy, the use of smoke will reduce the chances of accurate fire being brought against you.

- c. When executing the crossing, you must move quickly, keeping low and avoid being in silhouette. The best method to cross is in small groups at irregular intervals.

#### OTHER DANGEROUS AREAS

34. Other places which will pose a danger to you include open areas, roads and trails. The enemy may be observing these areas for movement and will likely cover them by fire:

a. open areas:

- (1) should be avoided except when absolutely necessary. Personnel should conceal themselves on the near side and examine the area before crossing. Once the crossing begins, move in arrowhead well dispersed with everyone alert and watching the flanks and far side;
- (2) when moving through tall grass or crops, you should alter your direction from time to time. This prevents the grass from waving in an unnatural manner and reduces the trail effect that would be created from a straight path; and
- (3) when crawling across ploughed fields, furrows should be followed as much as possible. If furrows must be crossed you should do so in a low area of the field;

b. roads and trails:

- (1) should be crossed near a bend or where they are the narrowest, so the enemy's observation is limited and the time of exposure is as short as possible; and
- (2) when crossing roadways as a group, you must place security teams on each flank covering the roadway left and right. When the area is secure, cross the road or trail as one group in an extended line.

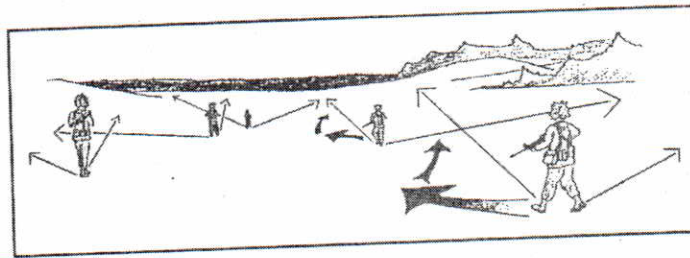


Figure 9-2-6 Responsibilities for Observation - Arrowhead Formation



### SECTION 3

#### ROUTINE IN A DEFENSIVE POSITION

##### GENERAL

1. To enable your unit to function effectively in a defensive position, a daily routine must be established and maintained. This will ensure that all necessary tasks are carried out.

##### ADDITIONAL TASKS

2. Information. Aside from your primary duty of defending your position, another of the many tasks that a soldier must undertake is the gathering and denying of information to the enemy. Between active engagements you must remain under cover to confound the enemy's attempt at gathering information about your activities and intentions. Conversely, you need to observe the enemy's behaviour to gain information about them:

a. information sources can include:

- (1) observations from weapon slits, sentry posts;
- (2) reports of shelling, mortar fire, enemy contact;
- (3) patrol reports; and
- (4) reports from observation posts;

b. information is denied by:

- (1) strict fire discipline - you must only open fire when ordered to do so;
- (2) concealment - you must maintain your camouflage, stick to the track plan and minimize movement and noise;

- (3) early warning - stay alert and report any unusual incidents immediately; and
- (4) patrols - you must move silently, observing your arc of fire at all times. Pay particular attention to the execution of drills and ensure all information is passed up and down the chain of command.

3. Maintenance of Arms, Equipment and your Position. Additional tasks which must be performed as part of a good defensive routine is the day to day maintenance of weapons, equipment and the position that you occupy. To ensure that your ability to fight does not degrade over time, there are a number of duties that you must see to every day:

- a. you must pack up all personal kit and stow it away when not in use;
- b. launder and air out towels, clothing and sleeping bags;
- c. clean and inspect weapons. If you are an LMG gunner, only one per platoon should be field stripped at a time;
- d. request the stores and consumables that you need. If you require something order it right away;
- e. clean and inspect optical instruments;
- f. clear your area of rubbish;
- g. maintain your personal camouflage;
- h. maintain your position camouflage;
- i. improve your position;
- j. update your range card if required;

- k. tactical feeding; and
- l. rest.

#### STAND-TO

4. Troops who stand-to in a defensive position are prepared to meet an enemy attack. To ensure a swift response to an order for stand-to, drills must be rehearsed. The stand-to may be ordered for your entire unit or a percentage as determined by your commander. You must be familiar with your duties during the stand-to; therefore, if you have doubts, ask your immediate superior. In addition, there will be daily inspections to evaluate the readiness of your unit. The following will be checked at stand-to:

- a. alarm posts and sentries,
- b. alarm signals for air and ground attack,
- c. arcs of fire,
- d. position of flanking units,
- e. orders for opening fire are clearly understood,
- f. track plan,
- g. reference points and range cards,
- h. passwords,
- i. fixed lines for LMG and GPMG,
- j. communications,
- k. surveillance devices,

- l. camouflage, and
- m. dress and equipment.

#### AIR AND GROUND SENTRY DUTIES

5. One of the most important jobs that you can be given is sentry duty.
6. Responsibility as a Sentry. Sentries must always be posted for the local protection of any formation to give early warning of enemy movement or attack and to check the identity of visitors or suspicious persons in the vicinity. They will be posted to give all round protection. You may be tasked by an officer or NCO who will post you and make sure that you know and understand your orders. The security of your unit depends on your alertness and that of the other sentries. While on sentry duty, you must never strip and clean your weapon, read, write or carry on with any activity which will divert your attention away from your duties.
7. Warnings. Warnings will be passed by whistle, voice, radio or by any other method detailed in orders. Included in your sentry duties you must be alert, and give the warning signal for enemy aircraft activity. The whistle signal for air attack is a series of short blasts. Because air attacks will be swift and often unexpected, early warning of probable air attack is necessary to give troops an opportunity to take cover. As a chemical sentry will have a similar task, the two will usually be undertaken by the same person. The speed of low-flying aircraft makes them difficult to identify; therefore, you must be skilled at friendly and enemy aircraft recognition. Hostile low-flying aircraft may appear suddenly from behind low hills, belts of trees, through haze or with the sun behind them.
8. Fifteen "Must Knows". If you are tasked with sentry duty, ensure you know all of the following:
  - a. where you must be while on duty (that is, your post or beat);

- b. the location of your immediate superiors and how to contact them;
- c. by day, if posted forward of the main position, the route that you must take to and from the position;
- d. the direction of possible enemy approach;
- e. what ground to watch;
- f. the positions of the flanking sentry posts;
- g. the names of landmarks to your front;
- h. details and positions of any intruder alarms or aids such as trip flares;
- i. the procedure for challenging;
- j. the password;
- k. the password for the next 24 hours if a change is due;
- l. orders for opening fire;
- m. particulars of friendly patrols in the area;
- n. the signal for defensive fire. Sentries manning GPMGs laid on fixed lines must know the open fire signal; and
- o. timings of mounting, relief and details of the relief system.

#### CHALLENGING

9. The standard challenging procedure must always be followed. Failure to do so may result in casualties being inflicted on our own troops, particularly returning patrols. You must always alert your



section commander if any unexpected person or group approaches the position and if the situation warrants it, the commander will stand the section to. As the sentry, you will do the challenging. Give the challenge quietly at a range that will enable the section to kill any enemy who tries to run away but not so close that an enemy could rush your post. If your order to halt is not obeyed, you must repeat it and if still not obeyed, then follow your orders for opening fire. The sequence is as follows:

- a. **"HALT-HANDS UP"** - Unknown person halts;
- b. **"ADVANCE (ONE) AND BE RECOGNIZED"** - person or group leader advances without replying;
- c. **"HALT!"** When the unknown person has approached sufficiently for you to be recognized or to give challenge. Person halts until recognized by you;
- d. **"CHALLENGE"** - is given in a low tone. Reply or password is given in a low tone; and
- e. **"ADVANCE ANOTHER ONE (or remainder) AND BE RECOGNIZED"** you call forward the remainder one by one as the situation or your orders demand. The second unknown (or remainder of group) advances at your order to be recognized. The group leader or person designated by the leader must remain with you to identify and count all members of his party to prevent infiltration by an enemy passing as a friendly.

#### PASSWORDS

10. A password will always be in two parts; for example:
  - a. challenge - "JAM", and
  - b. countersign - "TRACK".



## NOTE

If the two parts have some connection they will be easier to remember but the connection must not be so obvious that an enemy may guess the countersign. Passwords are changed daily at 1200 hrs (local time or ZULU time as ordered).

## EXPEDIENT WARNING DEVICES

11. When performing the duties of a unit sentry, you may not always have at your disposal the many high tech devices that can give early warning of an enemy's approach; therefore, there may be a need for expedient warning devices that are simple to set up and easily placed:

- a. Trip flares. Para flares and signal flares can be positioned with trip wires across paths or likely lines of approach;
- b. Cans. Can be partially filled with rocks and strung along a trip wire across paths or likely lines of approach;
- c. Tug wire. A strand of signals wire running from the sentry post to the section commander's trench, can be used to signal the section commander with a prearranged number of tugs to indicate various information;
- d. Light signals. The use of flashlights is effective by both day and night and can be used in conjunction with coloured filters. You must keep the code simple and the light must not be visible from the enemy side;
- e. Mines and booby traps. Various directional or bouncing type anti-personnel mines when properly placed are effective at giving early warning. The use of a simple can and smoke or fragmentation grenade booby trap strung with trip wire between two trees can also prove effective; and

- f. Whistles. The blast of a whistle is clear, distinct and can be heard over noise and distance.

### SEARCHING GROUND

12. Searching the ground around you must be carried out systematically:

- a. Normal method. the usual method of scanning is to divide the ground into foreground, middle distance and distance, then scan each from right to left. Where the ground is fairly open, this will be the best method and it has the additional advantage that the scanning is done horizontally, therefore the sense of scale does not have to be continually altered;

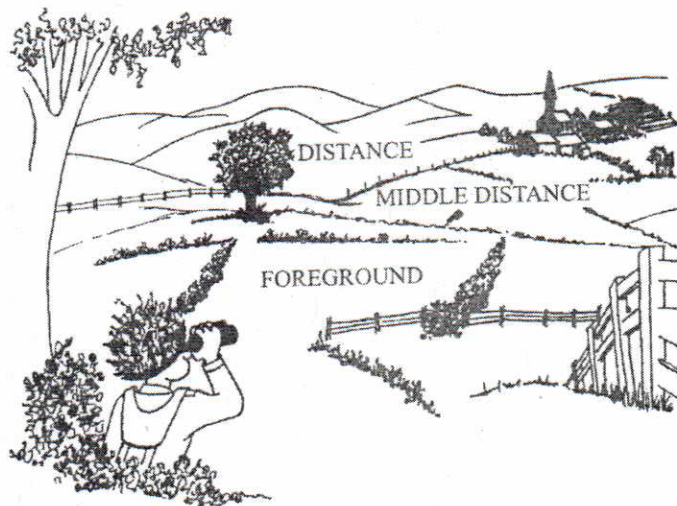


Figure 9-3-1 Searching Ground - Normal Method

- b. Close country. In close or broken country, different types of ground require different treatment and the normal method may have to be modified. One modification is:
- (1) carefully examine areas likely to contain enemy positions, either because of their tactical value, slope and relation to crests or they offer good cover;
  - (2) look along the junctions between such areas. Then examine all areas visible through any screen of trees or foliage;
  - (3) examine all remaining areas of light or sunlit ground; and
  - (4) examine all areas of dark or shadowed ground. The sequence adopted will depend on the terrain and the range of observation but it is essential to scan each area thoroughly and to ensure that none is omitted;
- c. Minimal light conditions. At dusk, half moonlight or on a starlit night, naked eye scanning should be slower. Under very low light conditions you can optimize your scanning technique by using off-centre vision. This in effect has you looking slightly away from the centre of the object as follows:
- (1) you should pause for a few seconds looking in one direction, paying attention to objects off the direct line of vision rather than directly at them;
  - (2) shift your line of vision by about 180 mils (a fists width at arms length) and again pause while objects become visible near your line of vision; and
  - (3) rest your eyes for 10 seconds every minute or two. When making use of binoculars at night, the same "move and stop" method should be used paying attention to objects visible "out of the corner of the eye";

- d. Seeing through. When attempting to see through a nearby screen, (trees, foliage, etc), you should look at the area under observation and ignore the screen. Eventually you will become trained to ignore the obstruction so that you keep your eyes on the distant view. With only small head movements, the area being observed is extended;
- e. Visual interference. Even when seemingly insignificant portions of an object are visible, the identity of the complete object can be determined. It is possible to determine that a person or a piece of equipment is present from the fact that small parts are in their correct relative positions;
- f. Off the line of vision. Incidents will rarely occur at the exact spot that you are observing. You must develop the ability to note sudden movement, changes in colour, flashes of light and inconsistent circumstances. The ability to note movement off the line of vision can only be developed through practice.

### PERSONAL FACTORS

13. A good observer does not depend on eyesight alone to carry out the task efficiently. Given average sight, any soldier can learn to become a good observer:

- a. Interest. All observation is selective. In order to increase your skill as an observer, you must know what you are interested in seeing and what you should look for. Interest may be stimulated by increasing your knowledge of the enemy situation and their operational methods, equipment and tactics;
- b. Under and over expectation. You will soon learn to recognize when your judgement can be trusted. In routine observation you will rarely start fully alert. During long periods without incident, you could be lulled into a false sense of security or may become bored. Conversely, if you are nervous or over excited, you may imagine you see those things that you expect to see;

- c. Comfort. If you are in a cramped or awkward position, you will not observe as efficiently as you otherwise would if you were comfortable. The importance of ease of observation should be continually borne in mind when selecting an observation post, although other considerations such as concealment and protection also affect the choice; and
- d. Use of binoculars. When using binoculars in open country, the sector is covered systematically and the eye examines the whole of each field of view both horizontally and vertically.

**NOTE**

In close country, binoculars are used to examine suspicious objects, and also to systematically scan areas of good cover, hedges, ground seen through trees and distant areas where the naked eye alone is inadequate.



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## SECTION 4

### JUDGING DISTANCE

#### GENERAL

1. It is important that you be able to judge distances accurately for the following reasons:
  - a. to accurately set your sights;
  - b. so others can set theirs;
  - c. for accurate reporting of enemy locations;
  - d. preparation of range cards; and
  - e. for calling down supporting fire.

#### UNIT OF MEASURE METHOD

2. By using a unit of known measure, an estimation of range can be made by superimposing the required number of units between the observer and the target then counting the total. You will use any unit that is known to be accurate such as the distance between two hydro poles (50 metres). First you study the 50 metres directly to your front, make a mental note of this area, and then try to determine how many of these sections or units would fit in between yourself and the target.
3. This system of judging distance requires practice and a good knowledge of the ground. You must be able to see all of the ground between yourself and the target, otherwise there would be nothing to which you could relate the unit of measure. This method is not accurate beyond 400 metres as it is too difficult to relate increments beyond that distance.

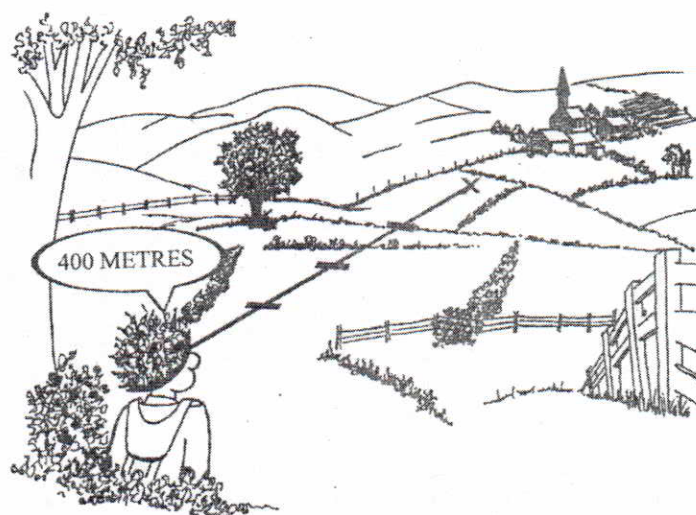


Figure 9-4-1 Unit of Measure Method

#### APPEARANCE METHOD

4. All personnel and equipment have distinct appearance characteristics at given distances. As the distance increases their appearance becomes obscure. By comparing the appearance of a soldier in positions at ranges of 100, 200, 300, 400 and 500 m, you can establish a series of mental pictures from which to refer when estimating the range of a target in the field. You will find that as the distances increase, the soldier's figure becomes smaller. The outline becomes increasingly blurred and other features gradually fade out.

5. The following may be used as a rough guide when judging the distance between an enemy soldier and you:

- a. 200 m - all parts of the body distinct;

- b. 300 m - outline of the face becomes blurred;
- c. 400 m - outline of the body remains but the face is difficult to distinguish;
- d. 500 m - body appears to taper from the shoulders, movement of limbs can be observed; and
- e. 600 m - head appears as a dot; body details not visible, body tapers noticeably.

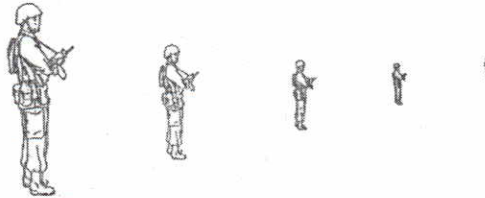


Figure 9-4-2 Appearance Of A Soldier At Various Ranges

#### CONDITIONS WHICH AFFECT ESTIMATION OF RANGES

6. There are several factors which can effect the estimation of ranges including light, colour, ground and position:

- a. objects seem nearer than they really are when:
  - (1) the object is in bright light, or the sun is shining from behind you;
  - (2) the colour of the object contrasts sharply with the colour of the background;
  - (3) looking over water, snow or a uniform surface;
  - (4) in the clear atmosphere of high altitudes;

- (5) there is dead ground between them and you; and
- (6) they are larger than other objects around them; and
- b. objects seem more distant than they really are when:
  - (1) looking over a depression all of which is visible;
  - (2) there is poor light, fog or the sun is in your eyes;
  - (3) only a small part of the object can be seen;
  - (4) looking down a street or tree-lined road;
  - (5) the object tends to blend in with the background;
  - (6) they are smaller than other objects around them; and
  - (7) you are lying down.

#### AIDS TO JUDGING DISTANCE

7. The skill of judging distances can be improved with practice and by knowing a few tricks that will help you in your estimation:

- a. Halving. A point is chosen half way to the target, then the distance is estimated to that point and doubled;
- b. Bracketing. If the target is known not to be more than "X" metres away, nor less than "Y" metres away, "X" should be added to "Y". Half of the sum is probably close to the range. For example, if "X" is 1000 m and "Y" 600 m, the range is 800 m. The further away the target, the larger the bracket should be;
- c. Key ranges. If the range to any point in the arc is known, the distance to other objects from it can be estimated;

- d. Unit average. Several personnel can judge a distance and an average can be made of their estimates; and
- e. Map. Estimates of range can be determined by using a map to plot your position, the position of your target then measuring the distance between them.

### CHRISTENING THE GROUND

8. Christening the ground is carried out at all levels, during all phases of war, whenever it is necessary to establish an area of responsibility. It clearly identifies prominent reference points within all areas of responsibility and provides a common framework for target indication.

9. The ground christening process will filter down through all levels of command. Your arc of fire, will include reference points as indicated by your commander. Therefore, it is vitally important for the defence of the entire position that you use those reference points accurately when indicating targets.

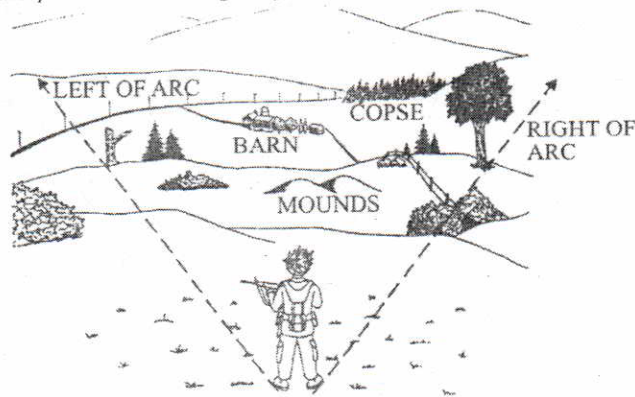


Figure 9-4-3 Christening the Ground



## RANGE CARDS

10. Various units in the Army may at some point during tactical field training or actual operations be required to prepare defensive works to protect itself from an enemy attack. To make your defence more efficient, every fighting trench will prepare a range card to register reference points within it's arc of fire, ranges and possible future targets.

11. Construction of Range Cards. Range cards may be prepared using a full 6400 mil circle or a 3200 mil half circle, depending on the nature of the defensive position and the depth of the defence. When you fill out your range card, only include those reference points which are prominent and easy to identify. This prevents the card from being cluttered with too much information which could cause confusion during the heat of battle. It allows easy orientation for anyone relieving you from your position. Range cards must not fall into enemy hands and will be removed when vacating the position.

12. When preparing your range card include the following information:

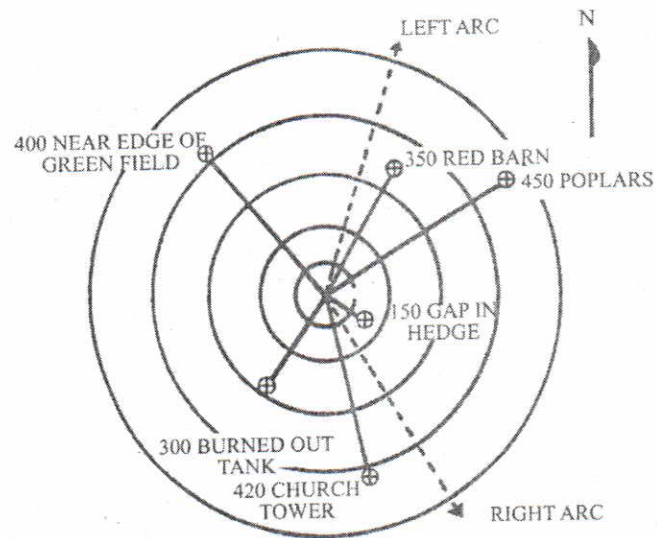
- a. primary and secondary arcs of fire as assigned by your section commander, indicated as dotted lines;
- b. prominent reference points including a short description and the range to each;
- c. location of adjoining trenches to prevent positions from accidentally firing on one another and to ensure all arcs of fire are interlocking;
- d. all likely target locations within your designated arcs will be marked. This is done by:
  - (1) estimating the distance to each object;
  - (2) drawing a small circle around the target object in the corresponding place on the range card; and



- (3) drawing a straight line from the object to your position;
- e. position from which card was made. For example, front centre trench, 3 section, 2 platoon;
  - f. method of obtaining range. Map, halving, judgement by eye, etc;
  - g. by whom the card was made out;
  - h. indicate North. Mark in the grid north to allow platoon level range card orientation; and
  - i. date. The exact date and time the card was prepared.

**NOTE**

Prominent objects farther than 500m are not included and it is important that the card be very neat and clearly illustrated to ensure that anyone can read it.



POINT FROM WHICH MADE OUT - Left end of 3 section's trench  
 METHOD OF OBTAINING RANGE - Judged by eye, checked by map  
 MADE OUT BY -  
 DATE -

Figure 9-4-4 Example of a Range Card

## SECTION 5

## FIRE ORDERS

## REQUIREMENT TO EMPLOY FIRE ORDERS

1. Fire orders are given to indicate a target and bring effective fire to bear. Fire orders must be used correctly to avoid danger to friendly troops, loss of surprise, premature disclosure of a position, application of fire onto unimportant targets, loss of time in adjusting fire and waste of ammunition.

2. Sequence. The sequence of a fire orders are the same on the range and in the field, they are "GRIT":

- a. Group. Indicates who will fire;
- b. Range. Indicates the distance to the target (not a reference point) which will give the observer an idea of how far away to look for the target, and at what range the sights must be set. Range is always given in metres;
- c. Indication. Guides the group onto the target by utilizing one of the following methods:
  - (1) direct,
  - (2) reference points,
  - (3) clock ray, and
  - (4) tracer.
- d. Type of fire. Indicates the rate at which the group will fire their weapons. The rates are categorized as follows:
  - (1) slow - 5 rds/min;

- (2) normal - 10 rds/min;
- (3) rapid - 20 rds/min;
- (4) single rounds - number of single rounds ordered; and
- (5) bursts - 2-3 round bursts.

#### TYPES OF FIRE ORDERS

3. The different types of orders and the situation when they are used are as follows:

- a. Ideal conditions. This defined as fire control orders given to the section when the enemy is easily located, for example:

**"NUMBER ONE SECTION - THREE HUNDRED - RUINED HOUSE - LEFT END - ENEMY MACHINE GUN - SLOW RATE - FIRE!"**.

- b. Brief fire orders. These are given when there is little time and the target is obvious, for example:

**"ENEMY - QUARTER LEFT - RAPID RATE - FIRE!"**.

- c. Delayed fire orders. These are used when action by the enemy can be foreseen. The group to engage the enemy is readied but held until the right moment before the order to fire is given, for example:

**"NUMBER FIVE SECTION - THREE HUNDRED - FARM HOUSE - IMMEDIATELY BELOW - ENEMY IN HEDGE ROW - NUMBER SIX SECTION IS MOVING THROUGH WOODS ON OUR RIGHT; WE WILL COVER THEIR ADVANCE WHEN THEY GET TO THE OPEN - RAPID - AWAIT MY ORDER (#6 section is about to come into the open) - FIRE"**.

or

**"NUMBER THREE SECTION - TWO HUNDRED -  
QUARTER RIGHT - SMALL WOOD - WHEN THE  
ENEMY COMES OUT THIS SIDE - RAPID - (then  
when enemy appears) - FIRE!"**

- d. Individual fire orders. This allows individual soldiers to choose their own moment to open fire, for example:

**"NUMBER THREE SECTION - TWO HUNDRED -  
SLIGHTLY LEFT - FARM BUILDING - ENEMY IN  
AREA - WATCH AND SHOOT WHEN YOU SEE A  
TARGET!"**

#### NOTE

Upon hearing a fire control order from a fellow section member or the section commander, each soldier will acknowledge that they understand.

#### ARCS OF FIRE

4. It is easier to indicate a target if the area in which it will appear is known. An arc of fire is an area of ground within which targets may be engaged. It contains imaginary lines from the weapon position through some easily identified point on the landscape which will be used to indicate right and left limits of the arc.

5. Example methods for indicating arcs of fire are:

- a. "LOOK TO YOUR FRONT - "HALF RIGHT - BEND IN ROAD - RIGHT EDGE - RIGHT OF ARC".
- b. "HALF LEFT - TWO TALL TREES - LEFT TREE - LEFT OF ARC".
- c. "NEAR LIMIT - ROAD RUNNING ACROSS (OUR) FRONT".

## INDICATING TARGETS

6. Once an arc of fire has been assigned and the ground has been christened, you may use one of several methods to identify the location of enemy troops:

- a. Tracer. A simple, quick and accurate method of indicating a target is to fire a tracer round at it. This may however, disclose your position. Prior to firing at the target, you will give a GRIT (Group, Range, Indication and Type of fire) to the remainder of your section. An example of using a tracer for target indication is as follows:

**"LEFT OF ARC - WATCH MY TRACER".**

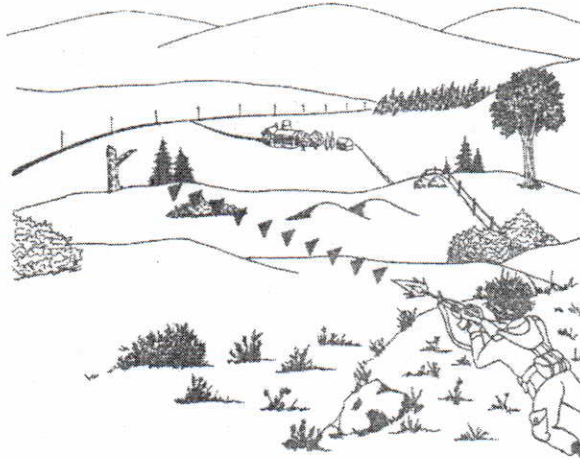


Figure 9-5-1 Target Indication From a Tracer



- b. Reference points. For targets which have not yet been seen by the remainder of your group, you can utilize any given reference point within your arc of fire. By naming a known reference point, then directing the view of your group above, below, left or right of the reference point, fire can be directed onto that position. An example of using a reference point for target indication is as follows:

- (1) "CENTRE OF ARC - FARM COMPLEX - RIGHT HAND BUILDING - MACHINE GUN;" or
- (2) "RIGHT OF ARC - TALL OAK - LEFT - ROCKS BY FENCE - SNIPER IN CENTRE."

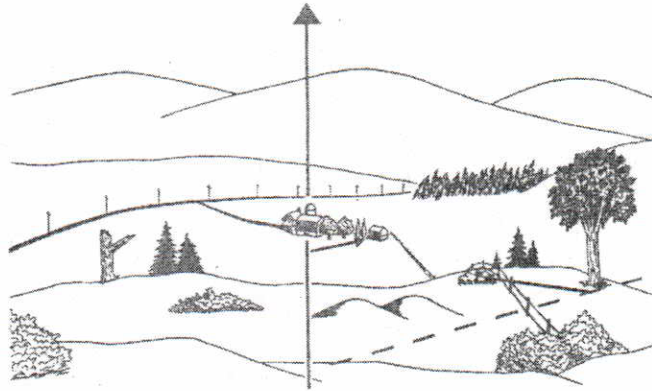


Figure 9-5-2 Target Indication From Reference Points

- c. Clock Ray Method. A further method of indicating targets which are difficult to identify is the use of the clock ray and a reference point. Using this method the observer mentally superimposes a clock face on the landscape with its centre at a reference point. The person indicating gives the range to the

target, the reference point, whether the target is right or left of it and the approximate hour on the clock face to indicate the direction from the reference point. An example of using the clock ray for target indication is as follows:

- (1) "200 - BARN - LEFT - EIGHT O'CLOCK - TANK"; or
- (2) "200 - BARN - RIGHT - THREE O'CLOCK - TREES - TWO RIFLEMEN RIGHT EDGE."

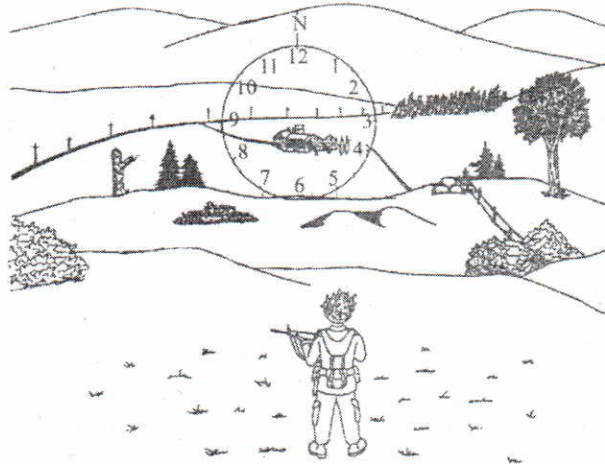


Figure 9-5-3 Target Indication - Clock Ray Method

- d. Direct. For targets appearing on terrain which has few reference points, the direct method is used as a means of focusing everyone's attention on the target. This method divides the ground to your front into a 3200 mil half circle. The area is then sub-divided left and right creating 1600 mil angles either way from the centre of arc. Now, each half is subdivided into quarters. By referring first to the centre of arc then to a quarter, half or three quarters, left or right, the target can be effectively indicated and brought to the attention of your group.

If the target is close to the centre of arc, then slightly left or slightly right will indicate a point half way between the one quarter mark and the centre of arc. An example of using the direct method for target indication is as follows:

- (1) "CENTRE OF ARC - 1/2 LEFT - SECTION ON ROAD;" or
- (2) "CENTRE OF ARC - 3/4 RIGHT - SNIPER IN TREE."

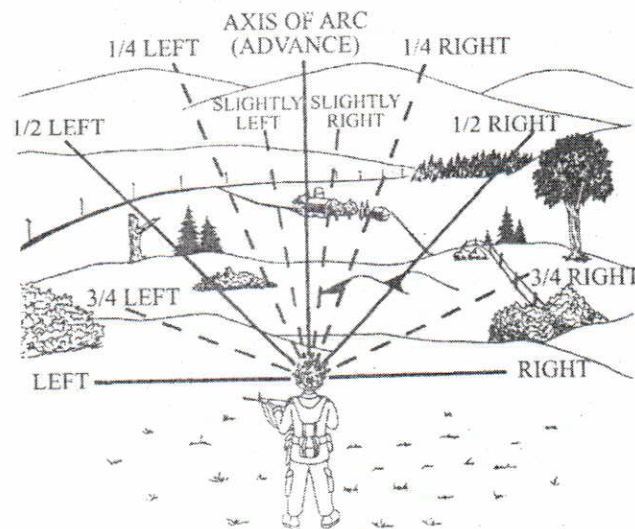


Figure 9-5-4 Target Indication From Arcs

#### AUXILIARY REFERENCE POINTS

7. Auxiliary reference points located close to the target may be used for target indication. If required, a succession of reference points can be called out to the remainder of your group. Ensure that each reference point is seen by everyone before moving on to the next one.

As each member identifies the reference point they will respond with "SEEN". An example of using successive reference points for target indication is as follows:

- a. "T JUNCTION - RIGHT - 4 O'CLOCK - BARN - RIGHT 80 MILS - HOUSE - RIGHT 40 MILS - TREES - ENEMY SECTION"; or
- b. "CENTRE OF ARC - 1/2 LEFT - DEAD TREE - RIGHT 20 - EVERGREENS - ENEMY RIGHT EDGE".

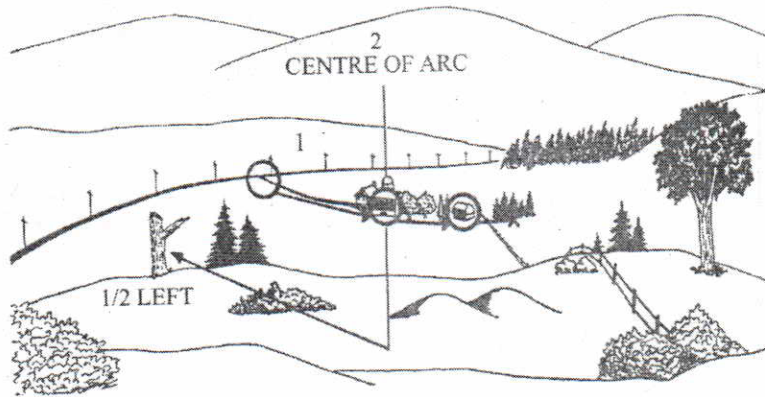


Figure 9-5-5 Target Indication From Auxilliary Reference Points

## CHAPTER 10

### NAVIGATION

#### SECTION 1

##### THE MAP

###### GENERAL

1. A map is simply a picture of the ground taken from a great height. It uses readily identifiable symbols to portray natural and man made features. Map symbols illustrated as marginal information on military maps are of standard design. Although maps are produced in various scales, the most commonly used military map reflects a scale of 1:50,000. This means that 1 unit of measure on the map represents 50,000 units of measure on the ground.

2. Maps are generally large and due to their fabrication, are predisposed to deterioration. To ensure that your map continues to be the quick and precise reference that it is intended to be, two preventative measures are required. First, if you intend to get prolonged use from a particular map, you must protect it against the elements by covering it with a waterproof material such as "map tac". Second, you must fold it using the accordion method to reduce it to a manageable pocket size. This will allow you to use any portion of the map without unfolding it completely.

###### ELEVATION AND RELIEF

3. Elevation is height expressed in feet or meters above or below mean sea level. Relief is the variation in the height and shape of the earth's surface. On a map elevation and relief are defined through contour lines.



## CONTOUR LINES

4. Contour lines are imaginary lines on the ground connecting points of equal elevation. The contour interval, the vertical distance between contours, is stated as map marginal information. The greater percentage of maps used by the Army today have a contour interval of 10 metres, (always indicated on the map) however, there are some that have contour intervals of 25 feet. Normally every fifth contour line is numbered and printed more heavily than the others. This line is known as the index contour.

5. Characteristics of contours:

- a. contours are smooth curves which are continuous and close onto themselves;
- b. when crossing a valley or stream, contours form a series of U or V having their bases pointing to higher ground or upstream;
- c. when crossing ridges, contour lines form a series of U or V with their bases pointing away from high ground;
- d. contours close together indicate a steep slope; contours far apart indicate a gentle slope;
- e. the last, (smallest) closed contour line indicates a hill top;
- f. if moving parallel to a contour line the going is relatively level. If moving across contour lines, it means going up or down slopes; and
- g. as a rule of thumb, to determine the elevation of a hill top, take the elevation of the last closed contour line and add one-half of a contour interval. To determine the elevation of a depression, subtract one-half the contour interval from the last depression contour line.



6. Contour Shapes and Features. The shape of contours indicates the shape of the ground. When contours are further apart, there is a greater distance to travel to gain or lose height and therefore the slope is more gentle than when the contours are closer together. When the contours are an equal distance apart, the slope is uniform. Contour lines are used to indicate the slopes and features on a map allowing you to draw a mental picture of the terrain or create a three dimensional tracing.

#### HILLTOP



ON MAP  
LAST CLOSED  
CONTOUR



ON GROUND  
WHEN YOU ARE LOCATED ON A HILLTOP  
THE GROUND SLOPES DOWN IN ALL  
DIRECTIONS

#### RIDGE



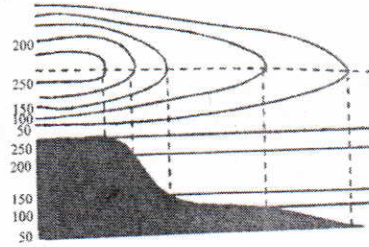
ON MAP  
U OR V SHAPED CONTOURS WITH  
THE BASE OF THE U OR V  
POINTING AWAY FROM HIGHER  
GROUND



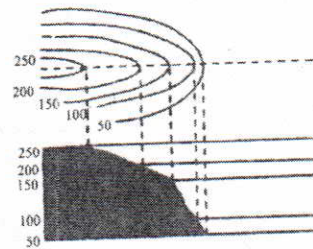
ON GROUND  
WHEN YOU ARE LOCATED ON A RIDGE,  
THE GROUND SLOPES DOWN IN THREE  
DIRECTIONS AND UP IN ONE DIRECTION

Figure 10-1-1 Contour Shapes and Features - Hilltop and Ridges

CONCAVE SLOPE  
(STEEPER AT TOP THAN LOWER DOWN)



CONVEX SLOPE  
(STEEPER AT LOWER END)



SPURS WITH RE-ENTRANT

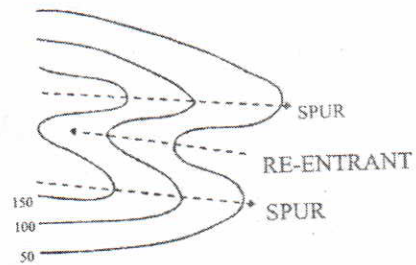
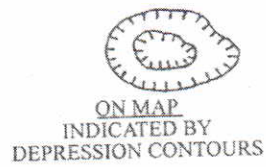


Figure 10-1-2 Contour Shapes and Features - Slopes

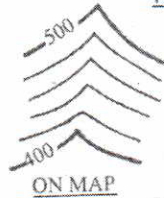
## DEPRESSION



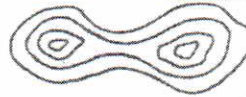
ON GROUND  
WHEN YOU ARE LOCATED IN A  
DEPRESSION, THERE IS HIGHER  
GROUND IN ALL DIRECTIONS



## VALLEY



## SADDLE



ON MAP  
HOURLASS OR FIGURE  
EIGHT SHAPED CONTOURS

ON GROUND  
WHEN YOU ARE LOCATED IN A  
SADDLE, THERE IS HIGHER GROUND  
IN TWO DIRECTIONS, AND LOWER  
GROUND IN TWO DIRECTIONS



Figure 10-1-3 Contour Shapes and Features - Depression, Valley and Saddle

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10-1-6

## SECTION 2

### NAVIGATING WITH A MAP OR COMPASS

#### GENERAL

1. The first step in successful navigation with a map is to become as familiar with the terrain to be traversed through an in-depth map study, as time will permit. This step is often overlooked by the beginner, leaving them unsure of the lay of the land when they begin the map march, especially during night operations.
2. A map study gives you the opportunity to verify all natural and man made features along your proposed route. It allows you to choose check points centred on prominent features along your route which ensure that you remain on-track.
3. A map study consists of interpreting the shape, height, nature and location of all permanent features situated in the area of the map march. If you have difficulty with interpreting the shape of the ground in your minds eye using contour lines, simply trace them and draw an approximation. This will give you a general picture to which you can apply height, notes on type of cover, rocky outcrops, waterways, roads and tracks and so on.
4. If you are a beginner, always draw a route card which will allow you to pinpoint all prominent features, obstacles and check points, along with the known distance from one to the other. This helps especially at night when you are required to verify your progress more often.
5. Learn to identify types of ground from smell and sound, (swamps, hay fields, rapids, dogs barking and lights in farm complexes, etc.) and the features that are always associated with each. To verify the general composition of high features at night, get as low to the ground as possible and check the horizon all around you. Prominent features as identified from your map study are usually discernable.

FROM: 514310 RD				717418 PLAITFORD (WOODS)	
REF: SHEET 131 1: 50,000 30 K.P.H				TO:	
GEN DIR	Distance (KM)	TIME	MAP REFERENCES	DIRECTIONS	DIAGRAMS
NE	5.0	0810	551328	BRIDGE Over R.R. Left Fork	
	2.5	0805	524327	TURN RIGHT	
	0	0800	514310	S.P. 	

READ ROUTE CARD FROM BOTTOM UP

Figure 10-2-1 Specimen Route Card

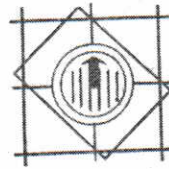
### ORIENTING A MAP

6. Orienting your map is the process of aligning the picture of the ground that it represents with the actual lay-of-the-land. The most common way of doing this, if you know your exact position on the ground and map, is to align the north edge of the map with the known direction of north and then verifying that all prominent features on the ground coincide with their representative symbol on the map. This should be a process of elimination, starting with the most prominent objects, (churches, bridges, bends in rivers, etc.) and ending with pinpoint objects, (corner of woods, crossing in trails, specific corner of a building, a small spur or re-entrant, etc.)

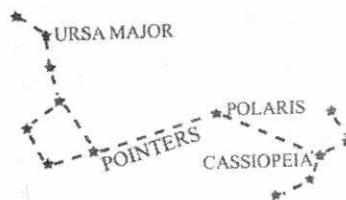


## FINDING NORTH

**BY COMPASS.** Ensure magnetic declination is set on compass. Place compass on map with compass meridian lines parallel to grid lines and orienting arrow pointing to top of map. Rotate map until magnetic needle lines up with orienting arrow.



**BY THE STARS.** In latitudes below  $60^\circ$  n the bearing of the Polaris star is never more than 40 miles from True North.



These constellations revolve counter-clockwise around the Pole.

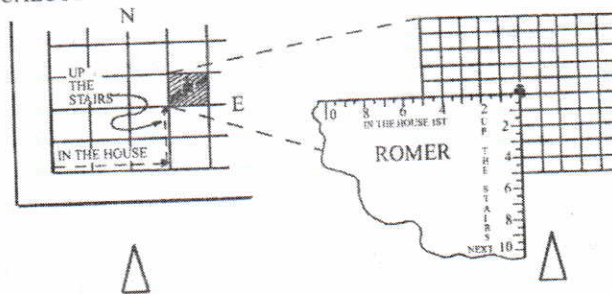
Figure 10-2-2 Orienting a Map

## GRID REFERENCES

7. Grid (GR) references indicate a specific area on a map. For example, we know that a grid square is always 1,000 m by 1,000 m, and has a four figure GR. A six figure GR in turn, is possible once the grid square is divided into 100 squares, formed by drawing 10 imaginary and equally spaced lines, vertically and horizontally within the grid square. The resulting smaller squares then represent an area of

100 m by 100 m. The division can be a mental calculation but to be as accurate as possible, the use of a romer is recommended. When pinpointing a specific 100 m square, within a grid square, the catch phrase to remember is "IN THE HOUSE FROM THE WEST, THEN UP THE STAIRS IS BEST".

TO CALCULATE A FOUR FIGURE GD      TO CALCULATE A SIX FIGURE GD



TO CALCULATE A FOUR FIGURE GR	TO CALCULATE A SIX FIGURE GR
<p>You want a four figure GR for the grid square with the church.</p> <p>Start at the South/West corner of the map. Read to the right until you reach the EASTING line closest to the church, it should be 91. Then read up the map until you reach the NORTHING line closest to the church, it should be 76. The GR is 9176.</p>	<p>You want a six figure GR for the church.</p> <p>Start as for a four figure GR. Once you have reached the EASTING (91) closest to the church, use a romer to count the 10ths of the grid square required to reach the centre of the church, which is 5. Write 5 behind 91 as EASTING 915 (In the house). Repeat the process for the second part of the GR. Write 5 behind 76, as NORTHING 765 (Up the stairs). The GR is 915765</p>

Figure 10-2-3 Grid References

## MAGNETIC DECLINATION

8. In order to reach the desired destination when you are marching with a compass, there are several preliminary functions that you must carry-out to properly set your compass. They must be done as precisely and conscientiously as possible, to ensure that your compass is in fact leading you in the desired direction, rather than getting you lost. This is especially true if you are going to do a night compass march.
9. Because the compass only reacts to magnetic north, you must be able to convert a bearing taken from a map and apply the difference to your compass to have it point you in exactly the same direction as the bearing on the map. To do this correctly, you must understand the different functions of the three norths symbol found in the marginal information of all maps. See drawing A below.
10. True North (TN) is the one that indicates the north pole. We will not use it other than when navigating by the stars.
11. Grid North (GN), the **map north**, is a theoretical point at the top of the world where all the grid lines converge. The grid lines in question, being part of the mercator grid system, are those lines that are running up and down your map, and are known as "EASTINGS". The grid north is used when determining the bearing of a specific direction from a map.
12. Magnetic North (MN), the **compass north**, is a physical location to which all compass needles of the world point. It is generally accepted to be the area encompassing the Baffin Islands in northern Canada. It is the point of convergence, of the earth's electro magnetic field, which is moving continuously. This is why you must calculate the magnetic declination from one year to the next.

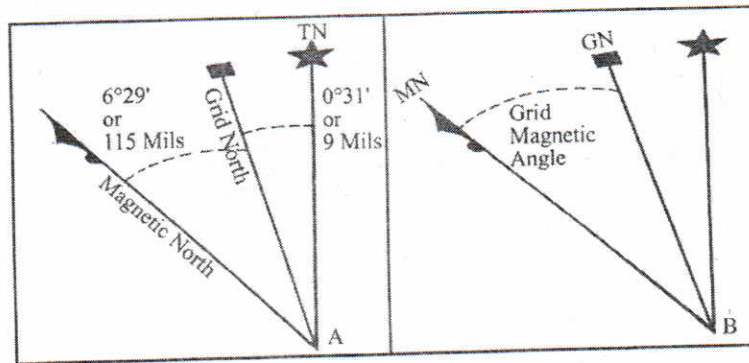


Figure 10-2-4 Magnetic Declination

**GRID MAGNETIC ANGLE**

13. The difference between the GN and the MN is known as the Grid Magnetic Angle (GMA), see drawing B above. To determine what the current GMA for your map is, simply follow these steps:

- a. locate the three north symbols on the margin of your map; and
- b. determine what the annual change is, then calculate the accumulated change.

14. Before you go on to do that, you must first understand how the numerical values, related to the GMA and the annual change are expressed. There are three types of values:

- a. Degrees. Expressed in a number and a small zero ( $1^\circ$ ). There are 360 degrees in the compass circle of 6400 mils;
- b. Minutes. Each degree is broken down into 60 minutes. Minutes are expressed as a number and an apostrophe (5'); and



- c. Seconds. Each minute is again divided into 60 seconds. Seconds are expressed as a number and a two apostrophes (16").

15. The level of accuracy required when working with Silva compasses generally precludes our calculating the seconds value. We simply round the seconds off to the nearest minute.

16. Because the Annual Change is expressed in minutes and percentages of minutes on the maps used by the Canadian Forces, a further small mathematical equation has to be followed. For our example we'll say the Annual Change is 10.2'. That indicates 10 and 2 tenths minutes. We know that each minute has 60 seconds and can therefore calculate that each tenth is actually 6 seconds. Therefore, 2 tenths of a minute would have a value of 12 seconds. This is expressed as 10'12".

17. We can now calculate the accumulated change. Our example indicates that the Annual Change is 10.2' and that it is increasing. We must now establish what the Approximate Mean Declination is and the year in which it was last issued. This information is also found on any map, directly below the three norths symbol. For our example the declination will be 10° 32' as of 1988.

18. To calculate the GMA for this year, you count the number of years from 1988 to 1994. This means that you'll have to calculate 6 years of annual change of 10.2 minutes as follows:

$$10.2' \times 6 = 61.2'$$

19. We said that we will round our seconds off to the nearest full minute. That will bring out total annual change to 61'.

20. We have determined that the approximate mean declination is 10°32', that it has changed by 61' since 1988, and that it is "increasing". From this we can establish the actual GMA.



21. When the GMA is increasing, meaning that the angle between GN and MN has been getting larger since 1988, we have to add the accumulated annual change to it. Our calculation then will be as follows:

$$\begin{array}{r} 10^{\circ} 32' \\ + 61' \\ \hline 10^{\circ} 93' = 10^{\circ} + 93' \end{array}$$

$$(93' \text{ divided by } 60') = 1^{\circ} 33' + 10^{\circ} = 11^{\circ} 33'.$$

22. Because each degree is made up of 60 minutes, we will round the  $11^{\circ} 33'$  off to  $12^{\circ}$ , because  $33'$  is just greater than  $1/2$  minute.

23. If on other maps the GMA is decreasing, meaning that the angle between GN and MN was getting smaller each year, then our calculation would be done by subtracting the accumulated annual change, from the Approximate Mean Declination, rather than adding it.

24. To set the declination on your compass, you must first go back to your map to determine whether the declination is in an easterly or westerly direction. This is established by checking the position of the MN in relation to the TN. If the MN symbol is situated to the left of the TN symbol, then the declination is in a westerly direction, conversely, if the MN symbol is to the right of the TN symbol, then the declination is going in an easterly direction. Once this is established, take the screwdriver attached to the compass lanyard and insert it in the declination mechanism screw.

25. To adjust the declination, turn the screwdriver clockwise for a westerly declination and counterclockwise for an easterly declination. You will note that the innermost scale of the compass dial is marked in degrees in both directions. It is numbered every twenty and marked every two.

**THE COMPASS**

26. Even small quantities of metal when in close proximity will cause false compass readings. Tanks, trucks and field guns will affect compass accuracy for a 50 m radius. A wire fence will interfere for 10 m. Articles such as rifles, helmets and ammo boxes should be removed to a distance of 3 m from the point where a compass is being used. Small items such as eye glass frames, watches, pocket knives and magazines will not affect a compass if kept in trouser pockets.

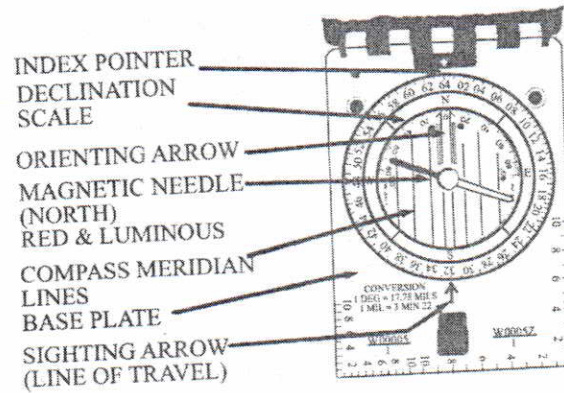


Figure 10-2-5 Compass

**OBSERVING WITH A COMPASS**

27. The following steps are taken to obtain a bearing or direction to an object which is visible:

- a. open the compass cover wide and hold it level and waist high in front of you;
- b. pivot yourself and your compass around until the sighting line points straight to the object on which you are taking the bearing; and

- c. turn the dial until the orienting arrow and the magnetic needle are lined up with the red end of the needle lying between the two orienting points.
28. The bearing to your object is the mil number indicated directly below the index pointer. For greater accuracy, bearings can be determined by using the sighting mirror as follows:
- a. hold the compass at eye level and adjust the cover so the top of the dial is seen in the mirror. Face toward your object and using the sight, align on the desired point;
  - b. look in the mirror and adjust the position of the compass so the sighting line intersects the luminous points; and
  - c. while sighting on your objective across the sight and continuing to ensure that the sighting line intersects the luminous points, turn the dial so the orienting arrow is lined up with the needle, its red end between the orienting points.

#### SETTING A MAP BY COMPASS

29. The compass "meridian" lines are used for setting and orienting a map with a compass. Ensure that the magnetic declination has been applied, then place the compass on the map so that the meridian lines are parallel to the "Eastings" and the sighting arrow is pointing towards the top of the map. Rotate the map with the compass on it until the compass needle is oriented north between the two luminous points on the orienting arrow. The map is now set with the grid lines pointing to grid north.

#### PLOTTING GRID BEARINGS

30. To take a grid bearing from a map, the compass can be used as a protractor, ignoring the compass needle. To read a grid bearing from one grid reference to another, place the compass with a long side on the line between the two references and with the sighting arrow in the

direction of travel. Next, holding the compass in position on the map, turn the dial so that the meridian lines are parallel to the "Eastings" ensuring that the north on your dial is towards the top of your map. The bearing may now be read from the graduated dial at the index pointer.

31. Upon completion of these steps, your compass has coincidentally been set to the bearing for your objective. By rotating the whole compass until you line up the rear end of the magnetic needle between the orienting points on the orienting arrow, your compass will be pointing in the direction of your objective. Holding the compass at waist height straight in front of you, march in the direction of the line of travel. As long as the compass needle and the orienting arrow are kept in coincidence, the sighting or line-of-travel arrow will remain on the bearing.

32. For night marches, the luminous bar on the magnetic needle and the two orienting points on the orienting arrow will assist in maintaining this coincidence. The line of travel is indicated by the luminous sighting arrow, index point and sight.

#### THE DO'S AND DON'TS

33. Following are a few of the do's and don'ts of navigating with a map or compass:

a. always do:

- (1) approach navigation with confidence;
- (2) an in-depth map study and if possible a physical reconnaissance;
- (3) make a route card for all map and compass marches;
- (4) once correctly set, always trust your compass;



- (5) back-track to a prominent known spot as soon as you think you are lost, don't wait until you are;
  - (6) your own calculation of declinations before using any compass;
  - (7) use a back-up pacer and map reader, especially for night operations; and
  - (8) navigate around major obstacles using three 90° legs or bearings; and
- b. if you can avoid it don't:
- (1) dismiss out of hand the advice or doubts of others;
  - (2) trust that black tracks, wood lines, orchards or the outer edge of towns or suburbs will be accurately reflected on your map;
  - (3) go around major obstacles on the same side. Alternate, first left then right;
  - (4) sight your compass on near or intermediate objects during compass marches. Use the farthest away at all times; and
  - (5) accept inexact pacing. The average person takes 120 paces to cover 100 m when going cross country on open ground. The normal rate of advance is 2.4 km per hour during the day and 1.6 km per hour at night, depending on terrain.

#### SHADOW TIP METHOD TO FIND DIRECTION

34. This method requires only ten to fifteen minutes in sunlight and is much more accurate than any watch method. Any error will not exceed 15 degrees. Mark the tip of the shadow cast from a 3-foot stick. Mark the tip of the shadow again after approximately ten

minutes. A straight line drawn through the two marks indicates the East-West line, from which any desired direction of travel may be obtained. To do this, draw a North-South line at right angles to the East-West line. If you are ever uncertain which is East and which is West, observe this simple rule: The sun rises in the East and sets in the West. The shadow tip moves in the opposite direction, therefore, the first shadow tip mark is always your West mark and the second mark is always your East mark, anywhere on earth.

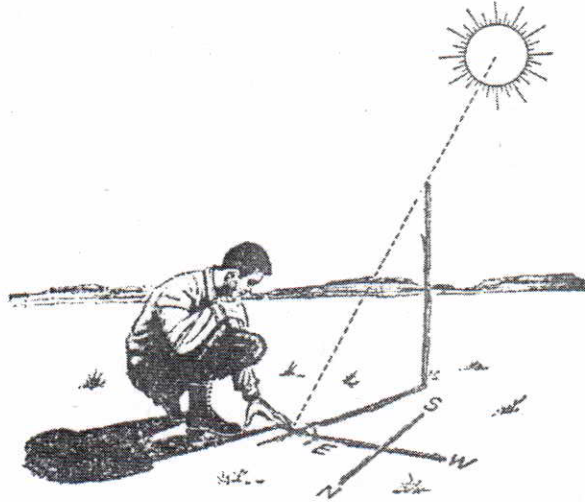


Figure 10-2-6 Shadow Tip Method to Find Direction



## CHAPTER 11

### RADIOTELEPHONE VOICE PROCEDURES

#### SECTION 1

#### COMMUNICATION PROCEDURES

##### COMMUNICATIONS SECURITY

1. Whether on exercise or in a theatre of operations you must expect your communications to be monitored. Care must be taken to ensure that only correct radiotelephone procedures are followed. There is no such thing as 100% communications security. All transmissions are of value to an adversary.
2. Each time that you press your presell switch, you are imparting information be it positive or negative. Your first transmission will tell the enemy that a transmitter exists and indicate it's general location. The only way we can effectively reduce the amount of intelligence gained by a potential enemy is to practice communication security and always apply the security rules for radiotelephone voice procedure.
3. Communications is a vital component of command and control and must not be compromised. There are twelve rules for communication security:
  - a. do not encode grid references that the enemy can identify, such as:
    - (1) encoding enemy positions;
    - (2) encoding your own position when in contact with the enemy; and

- (3) linking an encoded grid reference with a prominent object either artificial or natural;
- b. use radio appointment titles correctly. These are used in place of officer appointments and conceal the level of the net. They must not be used in place of call signs or address groups;
- c. do not talk about equipment, especially about your type of unit. This information should be encoded, as it can identify the net and tell the enemy of coming actions;
- d. encode correctly, the complete text must be encoded;
- e. do not send names, ranks or nicknames in clear since the enemy can identify the unit from them;
- f. use veiled speech whenever possible, it makes sense to you but not the enemy. For example, "REF YOUR MESSAGE, PARA 1, YES, OVER" or "MOVE TO THE SAME PLACE AT THE SAME TIME, OVER";
- g. use only authorized codes, jargon does not conceal any information and may confuse your own personnel;
- h. use uniform procedure, this prevents the enemy from identifying the unit or level of net;
- i. use nicknames correctly, only nicknames that convey pre-arranged instructions will be sent in clear;
- j. use address groups correctly, these are confidential three-letter groups used to conceal names or units and HQs. Never use the name of a unit in a transmission;
- k. be brief, do not send unnecessary messages. Casual conversation between operators can give away information. Remember that the enemy normally has direction finding equipment; and

- I. use authentication. It is a security measure designed to protect communications against enemy deception and his attempts to gain information.

#### FIXED CALL SIGNS

4. Call signs are used to identify specific stations. Call signs on unit and sub-unit nets are fixed and are assigned in accordance with a standard format.
5. Individual call signs consist of one or two figures which may be suffixed by a letter and or prefixed by one or two letters. The call sign identifies the station concerned and not an individual. Fixed call signs are not to be abbreviated and are assigned as follows:
  - a. one to four, inclusive, are used by the fighting squadrons, rifle companies or gun batteries depending on the arm of service;
  - b. the five series are used by support sub-units. For example, guided weapons support systems;
  - c. the six series are allocated to recce sub-units and air recce;
  - d. the seven series are assigned to non-battle group nets, to cater for the possibility of a fifth sub-unit of the parent arm joining the net. For example, a fifth company of infantry;
  - e. the eight series are used by the administrative groups;
  - f. the nine series are used by the command group; and
  - g. spare call signs at the unit level are A to N only.

**HEADQUARTERS STATIONS/VEHICLES**

6. At most headquarters, there are several stations which may be working on one or more nets. Normally at company/squadron/battery level, there are two radio nets, one working forward to the fighting echelon and one working to the rear or higher HQ. For convenience, these stations are identified by the use of letter suffixes.

All stations in the same vehicle use an identical suffix:

- a. HQ/RHQ stations are.....0A, 0B, 0C;
- b. A Company/Squadron HQ stations are...1A, 1B, 1C; and
- c. B Company/Squadron HQ stations are...2A, 2B, 2C, etc.

## THE PHONETIC ALPHABET

LETTER	PHONETIC	LETTER	PHONETIC
A	ALFA	N	NOVEMBER
B	BRAVO	O	OSCAR
C	CHARLIE	P	PAPA
D	DELTA	Q	QUEBEC
E	ECHO	R	ROMEO
F	FOXTROT	S	SIERRA
G	GOLF	T	TANGO
H	HOTEL	U	UNIFORM
I	INDIA	V	VICTOR
J	JULIET	W	WHISKEY
K	KILO	X	X-RAY
L	LIMA	Y	YANKEE
M	MIKE	Z	ZULU

7. Difficult words or groups of words within the text of plain-text messages may be spelled using the phonetic alphabet. This procedure is always preceded by the proword "I SPELL." When operators can pronounce the word to be spelled, they will do so before and after the spelling to identify the word. When it is necessary to identify any letter of the alphabet, the standard phonetic alphabet shall be used.



Example:

"11, THIS IS 1, MOVE TO TOPHAT, I SPELL T,O,P,H,A,T,  
TOPHAT, OVER."

#### PRELIMINARY CALLS (OFFERING A MESSAGE)

8. When the calling station wishes to ascertain whether the station called is ready to receive a message, a preliminary call will be sent before transmitting. Example: (in the following example 21C is ready to receive a message):

"21C, THIS IS 21 MESSAGE OVER"  
"21C, SEND OVER"

(if 21C is not ready to receive, he gives a "WAIT" or "WAIT OUT"  
and then reports when ready)

"21C, THIS IS 21 MESSAGE OVER"  
"21C, WAIT" (5 second pause)  
"21C, SEND OVER" (when ready)

#### ARM PREFIXES

9. Since all units use similar fixed call signs, it is necessary to have a system to identify the different arms while working on a common frequency. To facilitate close co-operation each arm is allotted a fixed "arm prefix". The arm prefix is a single letter used as a prefix to the fixed call sign of a subordinate unit working on the larger unit's net. Its use is restricted to unit nets for purposes of co-operation between arms.



INFANTRY	INDIA/KILO
ARMoured	TANGO/UNIFORM
ARTILLERY	GOLF
ENGINEERS	ECHO/FOXTROT
TACTICAL AIRCRAFT (FIXED-WING)	ALPHA
AIRBORNE	BRAVO
AMPHIBIOUS	CHARLIE
SUPPLY AND TRANSPORT	DELTA
MEDICAL	MIKE
ELECTRICAL/MECHANICAL ENGINEERS	ROMEO
MILITARY POLICE	PAPA
TRANSPORT AIRCRAFT	LIMA
TACTICAL HELICOPTERS	HOTEL/JULIET
SIGNALS	SIERRA

10. The arm prefix is never to be used:

- a. on formation nets;
- b. on independent nets; and

- c. as jargon, for example, "Pick up your Indians (infantry)".

- 11. An example of the proper use of arm prefix is as follows:

"I3, THIS IS G31, RADIO CHECK OVER"  
"I3 LOUD AND CLEAR, OVER"  
"G31, ROGER OUT"

- a. the arm prefix "INDIA" ("I3") denotes an Infantry call sign; and
- b. the arm prefix "GOLF" ("G31") denotes an Artillery call sign.

#### CALLING AND ANSWERING

- 12. All stations or net calls will be made by using the proword "ALL STATIONS". Net calls may be initiated by the control station or by a sub-station. Example:

"ALL STATIONS, THIS IS 0, MOVE NOW, OVER"  
"1, ROGER OUT"  
"2, ROGER OUT" .....ETC;

- a. if a station is working at the Sqn/Coy level, and communicating with it's troops or platoons, then the following applies:

"ALL STATIONS 1, THIS IS 1, MOVE NOW, OVER"  
"1B, ROGER OUT"  
"11, ROGER OUT"  
"11A, ROGER OUT" .....ETC;

- b. single, multiple and collective calls are accomplished in the same manner.

#### COLLECTIVE CALLS

- 13. Collective Calls are calls to certain pre-designated stations on a net using a collective call sign. This is qualified by letters or figures.

The stations are pre-arranged to suit any given situation. It is not essential for all nets to have them. Consider a situation where a squadron commander wishes to speak to all his troop leaders without having to call them by their individual call-signs. In the following example, substations have been designated by the collective call-sign CC3 and include 3B, 31, 32 and 33. Example:

"CC3, THIS IS 3, ROMEO VICTOR AT TREE TOP, OVER"  
 "3B, ROGER OUT", "31, ROGER OUT"  
 "32, ROGER OUT", "33, ROGER OUT".

#### TRANSMITTING A MESSAGE

14. Radio voice communications are used during all aspects of training. Atmospheric conditions will, at times, have a negative effect on your communications. The voice procedure used for transmitting messages under these conditions are as follows:

- a. Good atmospheric conditions. This is when communications are satisfactory and messages need only be transmitted once and preliminary calls are optional. Example:

"31, THIS IS 3, THE CONVOY HAS ARRIVED OVER"  
 "31, ROGER OUT";

- b. Poor atmospheric conditions. This is when communications are difficult and when call signs will be sent twice. Phrases, words or groups will also be sent twice using the proword "WORDS TWICE". Preliminary calls will be used as well. Example;

"31, 31, THIS IS 3, 3, MESSAGE, MESSAGE OVER"  
 "3, 3, THIS IS 31, 31, SEND, SEND OVER"  
 "31, 31, THIS IS 3, THIS IS 3, WORDS TWICE, WORDS TWICE, CONVOY HAS ARRIVED, CONVOY HAS ARRIVED, OVER, OVER"  
 "3, 3, THIS IS 31, THIS IS 31, ROGER, ROGER, OUT".

**OPENING A NET**

15. The following procedures shall be used when opening a net for the first time or when re-opening a net:

- a. the controlling station exercises strict control to ensure the proper exchange of traffic with a minimum delay. The controlling station is also responsible for security on the net and distribution of secure information to the appropriate call signs;
- b. before a net is opened, all stations will receive an instruction detailing information of the organization and communication structure of the net; and
- c. this information is called Communications Electronics Operating Instructions (CEOs), and includes the following:
  - (1) time the net is to be opened;
  - (2) composition of the net;
  - (3) call signs and address groups;
  - (4) codes, code words, and nicknames;
  - (5) frequencies assigned to the net;
  - (6) opening frequency; and
  - (7) security measures and authentication instructions.

16. The opening of a net is accomplished by first establishing communications. The control station calls all other stations on the net. The Net Identification sign must be used. Example:

"ALL STATIONS JULIET FOXTROT THIS IS 2, OVER"  
"2B OVER, 21, 21A, 21B, 21C OVER"  
"22, 22A, 22B, 22C OVER"  
"23, 23A, 23B, 23C OVER"  
"2, ROGER OUT".

17. If a problem occurs with one or more stations not being able to answer on time, the following procedure will apply:

"ALL STATIONS JULIET FOXTROT, THIS IS 2, OVER"  
"21, OVER"  
"21A, OVER"  
(21B is unable to answer)  
(21C waits 5 seconds then transmits)  
"21C, OVER"  
"22, OVER" etc;  
(c/s 2 then transmits)  
"2, ROGER, 21B NOTHING HEARD OUT"  
(If 21B can transmit before the end of the net check,  
s/he will answer after the last call sign.)

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## SECTION 2

### AN/PRC 77 SET

#### GENERAL

1. The basic, most portable means of electronic voice communication in the army is the AN/PRC 77 Set. This radio set is identical to the AN/PRC 25 set, except that it is completely transistorized, has improved re-transmission capability and a purge valve to allow gases to escape from the battery box.

#### CHARACTERISTICS

2. The AN/PRC 77 has the following characteristics:
- a. Frequency range. 30.0 to 52.95 MHz low band and 53.00 to 75.95 MHz high band.
  - b. Number of channels. 920.
  - c. Channel spacing. 50kHz.
  - d. Frequency modulation (FM)
  - e. Transmitter output power. 1.1 to 2.0 watts.
  - f. Range. 2.5 km with short antenna, 8 km with long antenna, 13 km when vehicle mounted with GRC 125.
  - g. Battery life. 20 hrs.

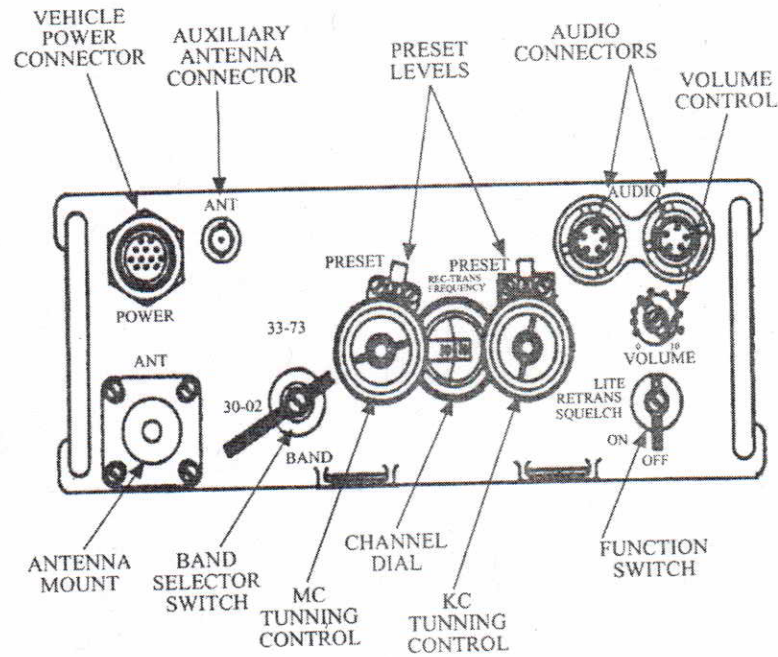


Figure 11-2-1 AN/PRC 77 Set Control Panel

#### OPENING UP DRILL

3. The correct sequence for assembling the components to operate the radio is as follows:
  - a. release both spring clamps, and remove the battery box;
  - b. remove the battery from its protective plastic cover;
  - c. place the battery onto the connectors;

- d. replace the battery box;
- e. connect the audio accessories, (headset and handset) to the output connectors;
- f. turn function switch to on, a rushing sound will be heard over the headset;
- g. set volume control to 4;
- h. check the dial light by holding the function switch in the "LITE" mode, the dial light should appear in the frequency window;
- i. return the function switch to SQUELCH or ON as required;
- j. turn the frequency control knobs to the required frequency;
- k. determine which antenna is required and install;
- l. establish communications as required; and
- m. rectify or report any faults found.

#### **CLOSING DOWN DRILL**

- 4. After the net closes down carry out the following:
  - a. remove antenna and stow;
  - b. remove audio accessories and stow;
  - c. turn volume to 0;
  - d. turn function switch to "OFF";
  - e. replace all connector covers;

- f. remove battery and mark on battery case the number of hours in use and the operators initials; and
- g. carry out user maintenance.

#### PREVENTATIVE MAINTENANCE

5. Ineffective communications can be caused by a variety of circumstances. You must not always assume that your problems are caused by excessive distances or bad terrain. Poorly maintained equipment and incorrect operation can be just as effective in preventing good communications, as location and your distance from other stations.

6. It is imperative that you understand the operating requirements of your radio. Nothing can replace timely equipment checks. These must be done before you take the radio into the field, not once it stops working.

7. The following must be attended to regularly:
- a. keep the set clean;
  - b. keep the set dry;
  - c. handle the set carefully;
  - d. if the performance of the set is in doubt, do the following operational checks;

ACTION	NORMAL INDICATIONS	CORRECTIVE MEASURES
Set volume control to 5.		
Set and hold function switch at LITE.	Channel dial fails to light.	1. Check that cover for power connector is in place. 2. Replace battery
Set function switch to ON.	Rushing noise is not heard.	1. Connect handset to other audio connector. 2. Check handset by substitution. 3. Replace battery.
Set function switch to SQUELCH.	Rushing noise is heard.	Higher maintenance is required.

Figure 11-2-2 Corrective Measures

- e. carry-out additional field expedient troubleshooting as follows:
- (1) all connectors must be clean and dry, especially antenna connectors. Connectors can be cleaned with pencil erasers. Never use abrasive materials. When clean, in extremely wet conditions, apply some body oil. This is obtained by rubbing your clean index finger along the lower portion of the side of your nose;

- (2) handsets and headsets must be kept clean and dry. During prolonged wet weather operations, periodically check the microphone portion of the handset for dampness. Unscrew the cover on the lower portion of the handset, carefully lift out the microphone and dry it off using a soft clean cloth. On assembly, ensure that the cover is securely fastened and that the plastic film and rubber seal are not broken; and
  - (3) check the battery for leakage, corrosion or swelling. Replace the battery with one that you are certain is fully charged. When operating in cold temperatures, carry the spare battery where it will remain as warm as possible in your sleeping bag or inside your parka.
8. When your equipment is in good operating condition and communications continue to be poor, the problem could be caused by:
- a. too great a distance between your set and others;
  - b. poor choice of location (siting) for your or the receiving station's set;
  - c. bad terrain such as mountains, high buildings or deep valleys;
  - d. atmospheric interference; and
  - e. interference from other frequencies;
9. To overcome these conditions move your set a short distance, even a few metres can make a difference.



## SECTION 3

## REPORTS AND RETURNS

## CONTACT REPORT

1. This report is sent to a unit or formation headquarters, usually by reconnaissance elements or advanced guards, reporting initial contact with enemy forces.

Letter	Format	Example
A	CONTACT WAIT OUT. This is not required in all circumstances, however, it is often used particularly in mob ops and serves as a preliminary wng and res the net for passage of more info by call sign in contact.	O this is 2 CONTACT WAIT OUT
B	CONTACT. Always sent at start of msg.	O this is 2 CONTACT
C	WHERE. Grid ref of en in clr	Grid 247863
D	WHAT. Description of en and what he is doing	TWO PT76 Tks MOVING SW
E	WHEN. Only used if there is a delay in sending report.	1038 hrs
F	OWN ACTION. What action is being taken by the pers in control.	C/S T32 IS ENGAGING

Figure 11-3-1 Contact Report

**NOTE**

1. This is a unit level report, but could also be used as the basis of a report to a formation headquarters, e.g. by the recce squadron in a brigade screen or covering force.
2. Subsequent reporting after initial contact should use the situation report format.

**SITUATION REPORT (SITREP)**

2. The Situation Report (SITREP) is the principal means of reporting the operation situation to higher headquarters. It portrays the situation in the area of the reporting unit or formation and includes administrative information which might affect the tactical situation.
3. SITREPs are submitted by all units and formations at timings specified in SOP, and immediately when significant changes in the situation occur. The routine submission of situations reports must not prevent information being passed back as quickly as possible whenever it is received. SITREPs need only state changes since last report. If no changes have occurred in the situation then this is reported as "no change".
4. Immediate SITREPs are sent by the quickest means, usually voice radio; periodic SITREPs can be sent the same way if brief, or as a written dispatch or message. Whenever SITREPs are given verbally, they must be confirmed in writing. They may also be sent by liaison officer, who can enlarge upon the contents if necessary. In the interest of clarity and brevity full use should be made of traces or overlays.

LETTER	TEXT	EXAMPLE
	WNG ORDER	"2 THIS IS 24, SITREP OVER"
A	ENEMY	" GRID 812542, EN TANKS MOVING SW, TP SIZE"
B	FRIENDLY	"ENGAGED, DESTROYED THREE REMAINDER MOVING SW"
C	ADMINISTRATIVE	"ETA OF EMERGENCY SUP RE OF AD REQUEST 4 HRS AGO"

Figure 11-3-2 SITREP

**LOCATION REPORT (LOCREP)**

5. This report is sent to the next higher headquarters by units and formations to report their locations immediately after every move.

6. Location reports must show the exact location of the headquarters originating them and the headquarters of its subordinate formations or units. Location reports from forward battalions should always show independent observation posts and detached platoon positions, as well as main company positions. Combat service support units must always show detachments such as ammunition points on their location reports.

7. These reports must be passed by the fastest means, normally by radio and, when possible, on-line encrypted.

LETTER	TEXT	TEXT
	WARNING ORDER	"2 THIS IS 24, LOCREP OVER"
A	LOCATION OF HQ	"CALL SIGN 24 LOCATED AT GRID (ENCODED)"
B	LOCATION OF ALL SUBUNIT'S	"CALL SIGN 24A LOCATED GRID(ENCODED), CALL SIGN 24B..ETC
C	LOCATION OF ALL ATTS AND DETS	"CALL SIGN 51 LOCATED AT GRID(ENCODED), CALL SIGN G14 LOCATED AT(ENCODED)"
D	OP'S AND STANDING PTLS	"OP AT CORNER OF WOOD LINE GRID(ENCODED)"
E	CONTACT POINTS	"CONTACT POINT LOCATED AT GRID(ENCODED)"
F	MISCELLANEOUS INFORMATION	"REQUIRE NEW CODES FOR UPCOMING EXERCISE, OVER"

Figure 11-3-3 LOCREP

## SECTION 4

### TELEPHONE SET TA-43/PT

#### DESCRIPTION AND DATA

1. Telephone Set TA-43/PT is a rugged, lightweight, waterproof, field telephone that may be used under all outdoor conditions or as a desk or wall mounted telephone. It can be placed in service rapidly in any position or location required by the tactical situation.
2. Telephone Set TA-43/PT consists of Handset H-60/PT, a panel and housing assembly, and telephone set case CY-1277/PT. The press-to-talk switch on the handset can be used to control remotely located radio sets or other equipment. The carrying case is equipped with a strap to carry the telephone set and loops to mount the telephone set on a vertical support.



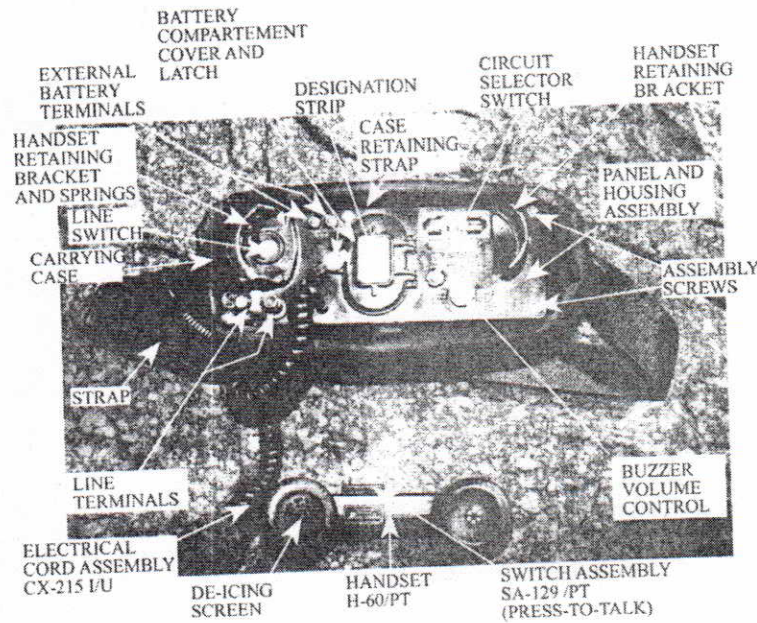


Figure 11-4-1 TA-43/PT Field Telephone

### OPERATING INSTRUCTIONS

3. Open the carrying case by sliding the fastener to the end of its run. Remove the handset from its packing. Fold the top of the case down around the housing to expose the handset and panel, without obstructing the generator and buzzer openings on the side of the housing. Install two batteries as follows:

- a. loosen retaining strap that secures panel and housing assembly;



- b. unlatch and open the battery compartment cover;
- c. insert one battery with its centre terminal down and the other up;
- d. close and latch the compartment cover, then refasten the strap.

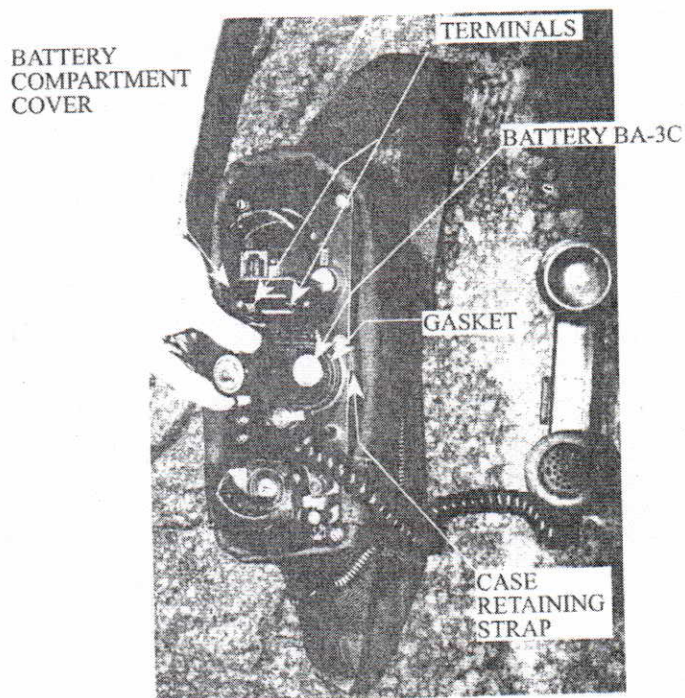


Figure 11-4-2 TA-43/PT - Replacing Batteries

4. Check the telephone for serviceability as described below:
- a. with the circuit selector switch set at CB, listen to the receiver while turning the hand generator crank. At low speeds, a series of clicks should be heard. At higher speeds, receiver sidetone should be heard when blowing across or speaking into the transmitter. Operating the line switch eliminates the sidetone and reduces the turning force required to turn the generator crank by removing the electrical load on the generator;
  - b. with the circuit selector switch set at LB, push the handset press-to-talk switch. Receiver sidetone should be heard when blowing across or speaking into the transmitter. Releasing the press-to-talk switch eliminates the sidetone and also reduces the turning force required to turn the generator crank; and
  - c. with the circuit selector switch set at CBS, repeat the checks for the LB circuit. Operating the handset press-to-talk switch should not affect the operation of the generator, but depressing the line switch should reduce the turning force required to turn the generator crank.

#### OPERATION UNDER NORMAL CONDITIONS

5. Outgoing Calls :
- a. CB Operation. Remove the handset from the retaining brackets and wait for the switchboard operator to answer; then proceed with the message. It is not necessary to operate the hand ringing generator.
  - b. LB Operation. Operate the generator crank rapidly for a short time. Remove the handset and listen for the called party to answer. Depress the press-to-talk switch and proceed with the message. The press-to-talk switch may be operated throughout the conversation but it is not required when listening only. Release the press-to-talk switch when listening ; this will extend the life of the batteries.

- c. CBS Operation. Remove the handset from the retaining brackets and wait for the switchboard operator to answer, then complete the call. It is not necessary to operate the hand generator.
6. Incoming Calls. The Procedure for answering incoming calls is the same for all types of service. Ringing current on the line from a switchboard or another station will operate the buzzer. To answer the call remove the handset from the retaining brackets and complete the call.

#### PREVENTATIVE MAINTENANCE

7. The following are some simple steps to perform to ensure that the field telephone is kept clean and serviceable:
- a. if available, use No. 0000 sandpaper to remove corrosion;
  - b. use a clean, dry, lint free cloth or a dry brush for cleaning;
  - c. keep all contact points free of corrosion;
  - d. inspect cord for damage or fraying;
  - e. check the line binding post connections;
  - f. inspect the buzzer diaphragm for dents or other damage;
  - g. check the receiver and transmitter caps for tightness; and
  - h. inspect the line switch and the press-to-talk switch for ease of operation.

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## CHAPTER 12

### NUCLEAR, BIOLOGICAL AND CHEMICAL DEFENCE

#### SECTION 1

#### NBC INDIVIDUAL PROTECTIVE EQUIPMENT (IPE)

##### GENERAL

1. There is no doubt that the threat posed by NBC weapons is very real. History has shown us how effective they can be. The actual employment of these weapons is less likely when their advantage is lost against a prepared adversary. No one will want to conduct a battle in an NBC environment unless they are assured of a victory as a direct result of the use of these weapons. When a unit is well trained in NBC defensive measures and drills, the effectiveness of these weapons will be reduced considerably.
2. You are trained to use your Individual Protective Equipment (IPE), which protects you to an acceptable degree, from the hazards of these weapons. If you are to survive in an NBCW environment, you must ensure that you remain current on the various individual survival drills. The effects of NBC agents will kill you if they enter your body as follows:
  - a. they can get through your skin by ABSORPTION;
  - b. through your mouth by INGESTION; and
  - c. breathing by INHALATION.
3. The following is the list of equipment that makes up your IPE. You must learn to recognize the items, become proficient in their use



and method of wear and know your respirator drill. The IPE consists of the following:

- a. NBC mask, canister, carrier,
- b. CW coveralls, CW overboots, CW gloves,
- c. 3 way detector paper x 2 booklets,
- d. Nerve Agent Vapour Detector (NAVD) x 2,
- e. decontamination mitt x 2,
- f. Reactive Skin Decontamination Lotion (RSDL) sachet x 2,
- g. nerve agent pre-treatment tablet set (carried only on order),
- h. Atropine HI-6 auto-injectors x 3 (carried only on order),
- i. Anti-convulsant auto-injector x 1 (carried only on order),
- j. plug set, and
- k. if you wear spectacles, a pair of respirator spectacles.

#### **DRESSING (DONNING) PROTECTIVE CLOTHING**

4. Depending on the threat and ambient temperature, three states of dress are available:

T = THREAT  
O = ORIENTED  
P = PROTECTIVE  
P = POSTURE





TOPP Low



TOPP Medium

Figure 12-1-1 TOPP Low - TOPP Medium

- a. TOPP LOW. The mask is in the carrier worn on the webbing. The individual protective equipment is within easy reach;
- b. TOPP MEDIUM. CW overboots are worn, and the CW coverall is worn with the zipper partially open and the velcro waist and ankle fasteners open. The CW gloves are tucked into the web belt and the mask is in its carrier. Dressing to topp medium involves the following drill:
  - (1) the headdress is removed;
  - (2) the zipper, wrist and ankle fasteners are fully opened;

- (3) the coveralls are held open and the feet are placed through the legs with feet pointed downwards to avoid jamming the boot in the coverall leg;
  - (4) the boot straps on the coveralls are centred in the instep of each boot;
  - (5) the bottoms of the coverall legs are folded up approximately 8 inches;
  - (6) the arms are placed through both suspenders and the coverall sleeves and the coveralls are pulled up onto the shoulders;
  - (7) the zipper and velcro fastener are closed to within approximately 8 inches from the neck;
  - (8) the CW overboots are pulled on over the footwear. The vulcanized rough patch on the upper of each overboot must face out;
  - (9) the ends of the overboot laces are wrapped once around the boot top, tied in a bow and the ends tucked in;
  - (10) the coverall legs are rolled back down over the overboots;
  - (11) the mask carrier and any other applicable equipment is donned;
  - (12) three-Way detector paper is affixed to the upper right shoulder, the lower left arm and the lower right front leg; and
  - (13) replace headdress;
- c. TOPP HIGH. CW overboots, CW gloves, the mask and the CW coverall are all worn. The coverall hood is up and all fasteners are secured. Subsequent to achieving TOPP MEDIUM, the following additional steps are required to reach TOPP HIGH:

- (1) headdress is removed;
- (2) mask is donned;
- (3) hood is pulled up;
- (4) zipper and velcro fastener are then secured; and
- (5) replace headdress.

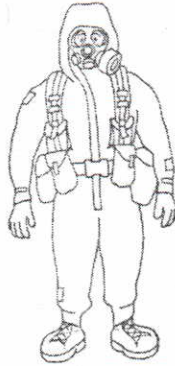


Figure 12-1-2 TOPP High

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## SECTION 2

### GENERAL INDICATORS OF BIOLOGICAL OR CHEMICAL ATTACK

#### CHARACTERISTICS

1. The following characteristics of your immediate surroundings will indicate that chemical or biological agents may be present:
  - a. suspicious liquids or solids on the ground or on vegetation;
  - b. unexplained smoke or mist;
  - c. dead or sick animals or birds; and
  - d. suspicious odours.

#### CHEMICAL AGENT INDICATORS

2. Initial detection will usually be characterized by the following:
  - a. irritation of eyes, nose, throat and skin;
  - b. headache, dizziness and nausea;
  - c. difficulty with, or increased rate of breathing;
  - d. a feeling of choking or tightness in the throat or chest;
  - e. strange or out-of-the-ordinary odours; and
  - f. strange flavours in food or water.

**BIOLOGICAL AGENT DETECTION**

3. The following may identify the presence of biological agents:
- a. an increase in sick or dead animals;
  - b. unusual or unexplained increase in the number of insects; and
  - c. enemy fire that does not seem to have an immediate casualty effect.
4. Some of the more common chemical agents which you are likely to encounter and treatment for them are:

CHEMICAL AGENT CHARACTERISTICS		
CHEMICAL	SYMPTOMS	TREATMENT
NERVE GAS	Breathing difficulties, tightness in chest, nausea, excessive sweating, vomiting, cramps, headache, coma, convulsions, drooling.	Administer atropine.
BLISTER AGENTS (mustard and arsenical gases)	Eyes inflamed, burning, blisters and tissue destruction.	Apply protective ointment to exposed areas.
CHOKING AGENT	Difficulty in breathing, tightness of chest.	Loosen clothing, avoid unnecessary exertion keep warm.
BLOOD AGENTS (cyanide, arsine gases)	Breathing difficulties, tightness in chest.	Administer Amyl Nitrate and artificial respiration.

Figure 12-2-1 Chemical Agent Characteristics (1 of 2)



TEAR AGENTS	Eyes water, intense eye pain, irritation of upper respiratory tract.	Air skin, flush irritated surfaces with water.
VOMITING AGENTS (CM, DA, DC)	Sneezing, nausea, salivation, vomiting.	Vigorous activity helps reduce nausea and its duration.
INCAPACITATING Agents	Abnormal behaviour, muscle weakness, central nervous systems disorders.	Supportive first aid and physical restraints in some situations.

Figure 12-2-1 Chemical Agent Characteristics (2 of 2)

**LOCAL ALARMS**

5. A local alarm system is used to indicate suspicion or detection of NBC hazards. Alarms such as the air raid siren may be heard first, followed by the local alarm for NBC hazards. You must therefore, know all local alarm signals as indicated in your unit SOPs. The following are examples of signals that may be used to indicate NBC hazards:

- a. Percussion. A systematic triple beat, then a pause, on any metal or other object that produces a loud noise such as a bell, metal triangle, iron railing, vehicle fender, etc;
- b. Horns and sirens. A horn signal of three short blasts followed by two seconds of silence, with the sequence repeated for one minute. A siren signal of three long warbling notes, each separated by silence;
- c. Vocal alarm. The shout of "GAS, GAS, GAS" for any type of attack that demands masking, supplemented by the shout of "SPRAY, SPRAY, SPRAY" for a liquid chemical attack;
- d. Automatic audible NBC detectors. Audible signals given by automatic detectors in the presence of NBC hazards; and

- e. Individuals. Masking, followed by exaggerated movements to attract attention; and
- f. Automatic visual NBC detectors. Visual signals such as, flashing lights given by automatic detectors in the presence of NBC agents.

### CAUTION

The local alarm may be given by anyone who suspects or recognizes the presence of NBC agents.

### NBC SIGNS

6. Known or suspected contaminated areas are marked with standard triangular markers. They are colour coded and labelled to indicate the contaminating agent. You must be able to recognize these markers.

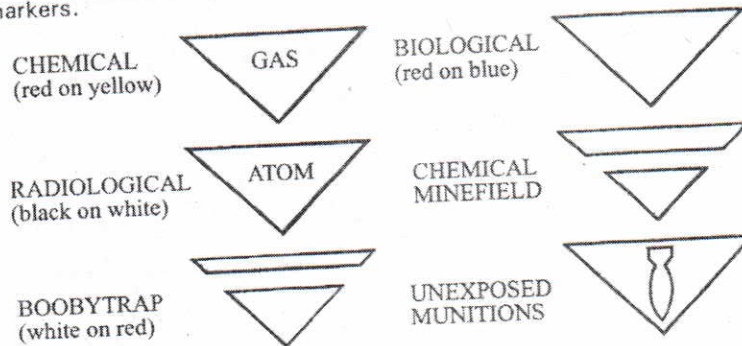


Figure 12-2-2 NBC Signs

### BCW SURVIVAL RULE

7. When the local commander has ordered that the BCW survival rule be put into effect, you, on your own initiative, must be vigilant for

the presence of biological and chemical agents. The catch-word AROUSE is used to remember the survival rule. Therefore if:

- a. Artillery or other bombardment is experienced;
- b. Raids or hostile acts are made by aircraft against your unit;
- c. Odours, liquids or solids, which are suspicious are detected;
- d. Unusual bomblettes or missiles are seen;
- e. Smoke or mist from an unknown source is present; or
- f. Effects on your body or on others is noticed; therefore, you must assume the presence of chemical or biological agents and perform the immediate action drill.

#### **MASK**

8. The mask is the most important single item of the IPE in NBC defence. As such, it must be properly handled and maintained. It is your responsibility to make sure the mask is put together correctly, that the canister is in good condition and that the mask is properly adjusted to fit. When caring for your mask, avoid the following:

- a. storage near heat;
- b. storage of unauthorized articles in carrier;
- c. dismantling of components without authorization;
- d. unnecessary stretching of the harness;
- e. unnecessary rough handling;

- f. leaving the mask in the carrier, for long periods, which promotes distortion. Remove the mask for a short period each week;
- g. allowing moisture to enter the canister;
- h. allowing dirt or dust to collect on or in mask or carrier; and
- i. unnecessary exposure to sunlight.

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**SECTION 3****DRILLS AND MOVEMENTS****SECTION MASKING DRILLS**

1. TOPP High. The masking drill can be carried out independently from TOPP Low or TOPP Medium; however, if the situation warrants that you mask, you should subsequently go to TOPP High. The following masking drill must be completed in nine seconds when the shout "GAS, GAS, GAS" or "SPRAY, SPRAY, SPRAY" is heard:

- a. stop breathing and close eyes;
- b. remove helmet with the right hand and place between legs;
- c. sling weapon;
- d. pull carrier release and hold open;
- e. don mask using the method described below:
  - (1) with the right hand, grasp the face piece by the outlet valve and remove it from the carrier;
  - (2) remove the plug set;
  - (3) place the left hand on the side of the canister so that the left thumb is in the lower left strap. Hook the right thumb into the lower right strap. Release the canister and hold the mask by the straps;
  - (4) insert your chin in the mask chin-cup and pull headharness over head;
  - (5) grasp the tab at the back of the headharness and pull downward;

- (6) tighten the two bottom adjustment straps, but do not over-tighten;
- f. blow out to remove any gas vapours;
- g. test for tightness;
- h. begin breathing;
- i. shout "GAS, GAS, GAS" or "SPRAY, SPRAY, SPRAY";
- j. replace helmet and check proper closure and seal all clothing;
- k. return plug set to carrier; and
- l. close and fasten the carrier.



2. TOPP Low. At the alarm "SPRAY", or upon being told that an aircraft is spraying a cloud, mask, sound the alarm, kneel, crouch or sit and cover you body with a shelter half. This should be done within 20 seconds.



On the alarm



Mask (don, clear, check) and give the alarm



Kneel, crouch or lie on the ground



Place your weapon across your lap



With a groundsheet, cover up with your equipment



Insure that the ground sheet is draped around you

Figure 12-3-1 Reaction to Alarm "SPRAY"

**IMMEDIATE ACTION DRILLS**

3. The Immediate Action drill is performed when:
  - a. ordered;
  - b. the NBC local alarm is given;
  - c. CB markers are seen; or
  - d. an event covered by the BCW survival rule occurs.

IMMEDIATE ACTION DRILL		
NO	DRILL	REMARKS
1	MASK	The shout of "SPRAY, SPRAY, SPRAY" supplements "GAS, GAS, GAS" for all liquid attacks.
2	TAKE OVERHEAD COVER	If the situation permits, to reduce the possibility of contamination.
3	CHECK DETECTOR PAPER	Check personal detector, or any located nearby. Watch other individuals for their reactions, in case personal detector paper is shielded.
4	IF... skin is contaminated, perform the ID Drill.	The Immediate Decontamination (ID)
5	IF... You have nerve agent effects, TAKE ATROPINE	Atropine should be administered IAW instructions.

Figure 12-3-2 Immediate Action Drills

**INDIVIDUAL DECONTAMINATION**

4. The responsibilities of the individual are limited to decontamination of the following:

- a. Face and hands. Decontaminate within the first two minutes of contamination;

- b. Body. Decontamination of the body should take place as soon as possible after contamination. All clothing should be removed, leaving the mask until last, then a thorough shower or bath should be taken, using generous quantities of soap and water. Preferably the soap should be germicidal and the water hot. Minor cuts and abrasions should be treated immediately;
  - c. Mask. Decontamination of the mask should be performed using the procedure for periodic cleaning and disinfection;
  - d. Clothing. To decontaminate clothing, wash thoroughly in hot soapy water;
  - e. Food. Unopened food cans should be thoroughly boiled or washed in soapy water before use;
  - f. Water. Water and drinking containers should be treated in the same manner as food containers. If it is essential to use uncovered water, it should be treated in the usual way with water purification tablets. If these are not available, the water should be boiled for about 15 minute; and
  - g. Eating utensils. Eating utensils should be washed thoroughly in disinfectant soap and hot water or boiled for 15 minutes before use.
5. The decontamination mitt is used for the ID Drill. Once exposed to contamination, it is not to be used on any exposed skin but may be retained for equipment decontamination.

**PERSONAL DECONTAMINATION DRILL**

Ser	DRILL	REMARKS
1	PREPARE A NEW DECONTAMINATION MITT AND PLACE IT ON ONE OF THE GLOVED HANDS	
2	DECONTAMINATE THE OTHER GLOVED HAND	BLOT!! BANG!!! RUB!!!!
3	REMOVE THE HELMET IF WORN, PLACE IT IN A CONVENIENT LOCATION	THE HELMET CAN BE SLUNG ON THE ARM, PUT BETWEEN THE LEGS, OR PLACED ON THE GROUND BUT AVOID FURTHER CONTAMINATION
4	DECONTAMINATE VELCRO FASTENER DOWN TO THE CHEST. UNDO VELCRO FASTENER	
5	PUSH THE HOOD BACK	
6	STEADY BREATHING HOLD LAST BREATH, KEEP EYES CLOSED	DO NOT BREATH OR OPEN EYES UNLESS MASK IS ON
7	UNMASK	HOLD MASK IN GLOVED HAND OPEN END DOWN

Figure 12-3-3 Personal Decontamination Drill (1 of 3)

Ser	DRILL	REMARKS
8	<p>RAPIDLY BUT THOROUGHLY DECONTAMINATE THE FOLLOWING IN THE ORDER STATED</p> <p>REMEMBER: <b>BLOT,BANG,RUB</b></p> <p>a. <u>FACE</u></p> <p>b. <u>EARS, NECK AND HAIR</u></p> <p>c. <u>INSIDE OF THE MASK</u></p>	<p>DECONTAMINATION CANNOT BE DONE IN ONE BREATH. RE-MASK ANY TIME MORE AIR IS REQUIRED. NORMALLY three or four UNMASKINGS WILL BE NECESSARY</p> <p>PAY ATTENTION TO THE AREA SURROUNDING THE EYES, NOSTRILS AND MOUTH</p> <p>PAY ATTENTION TO THE AREA UNDER THE CHIN, BEHIND THE EARS, AND THE BACK OF THE NECK</p> <p>PAY ATTENTION TO THE EYE PIECES AND OUTLET VALVE</p>
9	REPEAT STEPS 8a - 8b and 8c AS REQUIRED	REMEMBER TO BLOW OUT. TEST FOR AIR TIGHTNESS EACH TIME YOU PUT MASK ON
10	ONCE YQU HAVE DECONTAMINATED YOUR FACE DECONTAMINATE THE HEAD HARNESS AND OUTSIDE OF THE MASK	
11	REPLACE AND SECURE THE HOOD AND HELMET	
12	DECONTAMINATE GLOVED HAND AND ARM ABOUT HALF WAY TO THE ELBOW TO AID DECONTAMINATE UNDER OPPOSITE ARMPIT OR BETWEEN LEGS	
13	REMOVE GLOVE AND PLACE UNDER DECONTAMINATED ARMPIT OR BETWEEN LEGS	

Figure 12-3-3 Personal Decontamination Drill (2 of 3)



Ser	DRILL	REMARKS
14	DECONTAMINATE HAND	PAY ATTENTION TO THE INSIDE OF THE FINGERS AND THE NAILS
15	REPLACE GLOVE, SECURE VELCRO FASTENER, REMOVE DECONTAMINATION MITT FROM ONE HAND AND PLACE ON THE OTHER GLOVED HAND	
16	REPEAT STEPS 13 - 16 ON CONTAMINATED HAND	
17	RETURN DECONTAMINATION MITT TO MASK CARRIER	DO NOT USE THIS MITT AGAIN FOR DECONTAMINATION OF THE SKIN
18	REPLACE 3 WAY DETECTOR PAPER	RIGHT SHOULDER, LEFT FOREARM, RIGHT LEG ABOVE THE BOOT

Figure 12-3-3 Personal Decontamination Drill (3 of 3)

**DRINKING**

6. Due to heat related sickness inherent to the IPE, it is imperative that you be able to drink. The following drinking drill applies only to the C3 Mask and old style water bottle. Drinking will only be performed when ordered to do so:

- a. when the order to drink is given, you will:
  - (1) remove the helmet;
  - (2) prepare a decontamination mitt and place it on the hand to be used; and
  - (3) decontaminate the other gloved hand;

b. prepare to drink as follows: and

- (1) decontaminate the water bottle. Hold it in the hand covered by the mitt;
- (2) unfasten the hood with the free hand;
- (3) take a few deep breaths to steady the breathing and hold the last one; and
- (4) close the eyes, grasp the outlet valve of the mask with the free hand and pull the face piece out and up only far enough to allow access to the mouth;

c. the procedure for drinking water with the drinking device is as follows:

- (1) insert the drinking device into the canteen connector cap;
- (2) grasp the mouthpiece with your teeth. To assist in locating the mouthpiece, place your thumb between the facepiece and the elbow of the drinking assembly and lever it outward until the mouthpiece can be grasped;
- (3) raise the water bottle and squeeze, the water will then flow through the mouthpiece;
- (4) periodically you must force air into the water bottle by blowing into it or lowering it to reduce the vacuum that is created;
- (5) when finished, blow through the mouthpiece to clear water from the quick-disconnect, then disconnect the drinking device and return it to the holder on the chin of the facepiece.

### CAUTION

Wearers of combat spectacles should take care that the ear loops do not become dislodged.

### URINATING AND DEFECATION DRILLS

7. Ideally, urinating and defecation drills should be performed only in a hazard free environment. If this is not possible, carry out the following drills.
8. Urinating for males:
  - a. decontaminate using the mitt:
    - (1) CW gloves;
    - (2) six inches of the sleeve at the cuff area; and
    - (3) an area along the bottom of the front closure;
  - b. from the bottom, undo enough of the front fastener for the task at hand;
  - c. undo the hook and loop at the cuff, remove the glove from the hand normally used, and fold and hold it in the gloved hand;
  - d. grasp one side of the undone portion of the CW coverall with the gloved hand and pull it open far enough to allow access to the inside of the CW coverall with the bare hand;
  - e. urinate in the normal manner ensuring that the exposed portions of the hand and body do not come into contact with any contamination on the CW coverall; and

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- f. after urination replace the glove and further decontaminate the gloves before tucking the gauntlet under the sleeve. Secure all fasteners.

9. Male/female defecation and female urination. The male defecation drill is identical to the female urinating and defecating drill and is carried out as follows:

- a. decontaminate your ensemble;
- b. remove headdress and equipment and place in a suitable location;
- c. undo the fasteners and pull the hood back off the head;
- d. undo both sleeve hook and loop fasteners and pull the glove off one hand, fold and retain it in the gloved hand;
- e. grasp the coverall from the rear with the gloved hand, then pull the shoulder and arm of the bare hand out of the suit;
- f. with the bare hand, push the suit and harness off the other shoulder from the inside;
- g. replace the glove on the bare hand, remove the other glove and retain it in the gloved hand. Remove the bare hand and arm from the sleeve. Place toilet paper inside the gauntlet of the gloved hand;
- h. grasp both sleeves and the hood between the legs with the gloved hand and pull forward under the crotch and hold in position;
- i. use the bare hand inside the suit and roll down combat trousers as far as required to crouch easily. Keep free sleeves tightened to prevent the suit from touching the ground;
- j. with bare hand adjust inner clothing;

- k. urinate or defecate in the normal manner;
- l. re-adjust inner clothing with the bare hand;
- m. move forward;
- n. straighten up, release the sleeves and hood ensuring they do not touch the ground;
- o. place the bare hand into the suit and through the harness into the sleeve;
- p. replace the glove on the bare hand. Remove the other glove, and place the bare hand through the harness into the sleeve. Work the suit and harness back up onto the shoulders;
- q. replace the glove;
- r. replace the hood;
- s. decontaminate the gloves before tucking the glove gauntlets under the sleeves;
- t. secure the front and sleeve fasteners; and
- u. replace equipment and head dress.

**NOTE**

Toilet Paper should be carried inside the IPE or obtained from a protected container.



**MOVEMENT THROUGH A CONTAMINATED AREA**

10. Avoid contaminated areas or pass through them as rapidly as possible. If required to remain in or pass through contaminated areas, you must:

- a. use your IPE for self protection;
- b. when possible, use vehicles to traverse the contaminated area on the up-wind side. Vehicle windows and doors must be closed, heaters/blowers turned off, tarps closed and secured. Vehicle movement must conform to the following:
  - (1) extend vehicle interval to 125 m and slow to 8 kph;
  - (2) avoid brushing under trees and driving through puddles;
  - (3) do not follow directly behind the vehicle in front and avoid any dust or debris thrown up from wheels and tracks; and
  - (4) after crossing the area, check for contaminants;
- c. select routes or bivouac areas on high ground since chemical agents tend to be heavier than air and settle in low places. Avoid cellars, trenches, gullies, valleys and other low places where agents may collect;
- d. avoid unnecessary contact with contaminated surfaces such as buildings, debris, woods, shrubbery, tall grass, and puddles. These areas tend to retain the agent for extended periods; and
- e. do not stir up dust unnecessarily.



## SECTION 4

### NUCLEAR DEFENCE AND SHELTERS

#### NUCLEAR DEFENCE

1. Your reaction to an unexpected nuclear attack should be as follows:
  - a. drop flat on your stomach with your feet toward the explosion, close your eyes, place your hands under your face and put your head down; and
  - b. remain in position for 90 seconds from the time of the blast.

#### REACTION TO WARNING OF A NUCLEAR EXPLOSION

2. When in a defensive position, you will be notified that there will be a nuclear explosion, you must take shelter as indicated in the following diagrams:

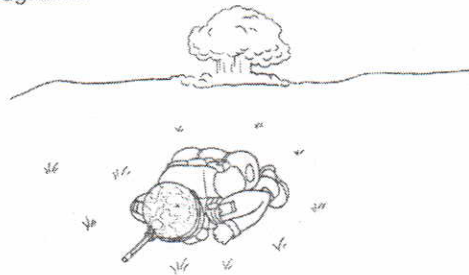


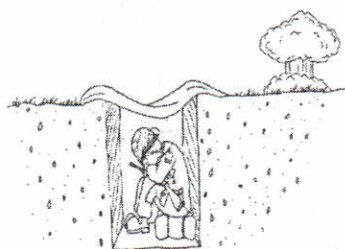
Figure 12-4-1 Reaction to Nuclear Explosion When in the Open



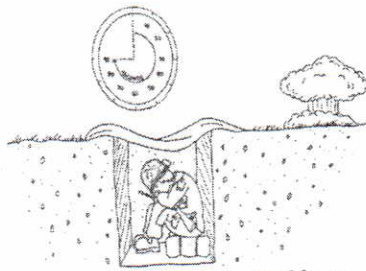
Move into the nearest fighting hole or shelter.



Cover the fighting hole if material is available.



Place your back in the suspected direction of the explosion.

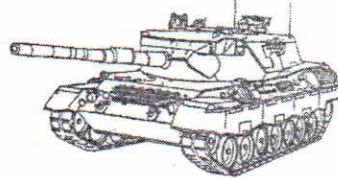


Remain in this position for 90 sec following the blast. (Until the shock wave has passed and debris has stopped falling.)

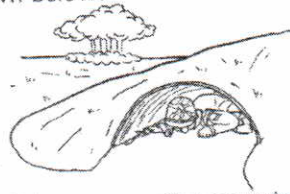
Figure 12-4-2 Reaction to Nuclear Explosion When Near a Trench

### TYPES OF SHELTERS

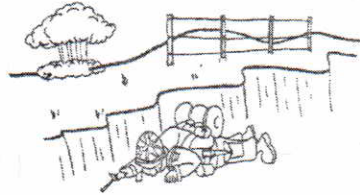
3. Shelters are classified as excellent, very good, good, and fair. Examples of these shelters are shown below:



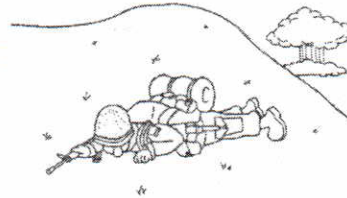
Tanks and APC's are excellent protection.



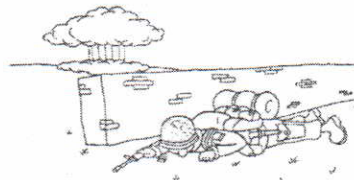
Culverts are excellent protection.



Ditches are good protection.



Hills are good protection.



Walls are fair protection.

Figure 12-4-3 Reaction to Nuclear Explosion When Near Natural or Artificial Material

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12-4-4

NBCD TESTS

BCW SURVIVAL RULE

TEST ELEMENTS	P/F
a. Artillery or other bombardment is experienced;	
b. Raids or hostile acts are made by aircraft against your unit;	
c. Odours, liquids or solids, which are suspicious, are detected;	
d. Unusual bomblettes or missiles are seen;	
e. Smoke or mist from an unknown source is present; or	
f. Effects on your body or on others is noticed; therefore, you must assume the presence of chemical or biological agents and perform the immediate action drill.	

PASS: If all answers are correct.

FAIL: If any answer is incorrect or is omitted

RECOGNIZE WEAPON EFFECTS

TEST ELEMENT	P/F
<b>CHEMICAL AGENTS</b>	
a. irritation of the eyes, nose, throat and skin;	
b. headache, dizziness and nausea;	
c. difficulty with, or increased rate of breathing;	
d. feeling of choking or tightness in the throat or chest;	
e. strange or out-of-the-ordinary odours; and	
f. strange flavours in food or water.	
<b>BIOLOGICAL AGENTS</b>	
a. an increase in sick or dead animals;	
b. unusual or unexplained increase in the number of insects; and	
c. enemy fire that does not seem to have an immediate casualty effect.	

PASS: If correctly answers 6 out of 9  
FAIL: If there is more than three answers incorrect



**USE DETECTOR PAPER**

TEST ELEMENT	P/F
a. correctly position the detector paper on the IPE: (right shoulder, left forearm, right leg above the boot).	

PASS: If all actions are carried out correctly  
FAIL: If any action is incorrect or omitted.

**IMMEDIATE ACTION DRILL - METHOD A**

TEST ELEMENTS	P/F
"GAS, GAS, GAS"	
a. stop breathing and close the eyes;	
b. remove headdress (helmet) with the right hand and place between legs, (sling the weapon if carried);	
c. pull carrier release and hold it open; and	
d. don mask using method A.	
<b>METHOD A</b>	
a. with the right hand grasp the face piece by the outlet valve and remove it from the carrier;	
b. remove the plug set;	
c. place the hand on the side of the canister so that the left thumb is in the lower right strap. Release the canister and hold the mask by the straps;	

d.	thrust out the chin and dig it into the chin cup. Slide the straps over the head and ensure that the pad is centred at the rear;	
e.	smooth out folds in the face piece or untwist straps;	
f.	blow out to remove any gas vapours;	
g.	test for tightness;	
h.	shout <b>GAS, GAS, GAS</b> , or <b>SPRAY, SPRAY, SPRAY</b> ;	
i.	replace headdress or helmet;	
j.	return plug set to carrier; and	
k.	close and fasten carrier.	
<b>NOTE:</b> On completion of the masking drill the soldier is to continue with the immediate action drill as follows:		
l.	<b>TAKE OVERHEAD COVER</b> - If the situation permits, to reduce the possibility of contamination;	
m.	<b>CHECK DETECTOR PAPER</b> - Check personal detector or any located nearby. Watch other individuals for their reactions, in case personal detector paper is shielded;	
n.	IF..... skin is contaminated, perform the ID drill. Carry out Immediate Decontamination; or	
o.	IF..... you have nerve agent effects, <b>ADMINISTER ATROPINE</b> . Atropine must be administered IAW standard operating instructions.	

PASS: If all actions are performed correctly.  
FAIL: If any action is performed incorrectly or is omitted.

**NOTE**

The assessor is required to prompt the soldier being tested for steps n and o of the immediate action drill, by asking what would be done if the effects of those steps were present.

**IMMEDIATE ACTION DRILL - METHOD B**

TEST ELEMENTS	P/F
"GAS, GAS, GAS"	
a. stop breathing and close the eyes;	
b. remove headdress (helmet) with the right hand and place between legs, (sling the weapon if carried);	
c. pull carrier release and hold it open; and	
d. don mask using method B.	
<b>METHOD B</b>	
a. with the right hand grasp the face piece by the outlet valve and remove it from the carrier;	
b. remove the plug set;	
c. place the hand inside the face piece with the pad resting against the back of the hand;	
d. force the pad away from the face piece extending the straps and move the mask towards the top of the head. Guide the pad to the back of the head;	

e.	force the face piece outward and downwards into position on the face. Maintain pressure on the pad and locate the mask on the face;	
f.	remove the left hand and allow the pad to snap into position at the centre of the back of the head;	
g.	smooth out folds in the face piece or untwist straps;	
h.	blow out to remove any gas vapours;	
i.	test for tightness;	
j.	shout <b>GAS, GAS, GAS, or SPRAY, SPRAY, SPRAY;</b>	
k.	replace headress or helmet;	
l.	return plug set to carrier; and	
m.	close and fasten carrier.	
NOTE: On completion of the masking drill the soldier is to continue with the immediate action drill as follows:		
a.	TAKE OVERHEAD COVER - If the situation permits, to reduce the possibility of contamination;	
b.	CHECK DETECTOR PAPER - Check personal detector or any located nearby. Watch other individuals for their reactions, in case personal detector paper is shielded;	
c.	IF..... skin is contaminated, perform the ID drill. Carry out Immediate Decontamination; or	



d. IF..... you have nerve agent effects, ADMINISTER ATROPINE. Atropine must be administered IAW standard operating instructions.	
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PASS: If all actions performed correctly.

FAIL: If any action is performed incorrectly or is omitted.

#### NOTE

The assessor is required to prompt the soldier being tested for steps n and o of the immediate action drill, by asking what would be done if the effects of those steps were present.

#### DON IPE

TEST ELEMENT	P/F
a. adopt the TOPP LOW posture;	
b. adopt the TOPP MEDIUM posture; and	
c. adopt the TOPP HIGH posture.	

PASS: If all actions are carried out correctly.

FAIL: If any action is incorrect or omitted.

PERFORM MASKING DRILL IN TOP MEDIUM

TEST ELEMENT	P/F
a. complete masking drill in 9 seconds or less (as per serial 4); and	
b. complete closure of the IPE in 15 seconds or less (TOPP HIGH).	

PASS: if all actions are carried out correctly within specified time.

FAIL: If any action is incorrect or over specified time.



PERSONAL DECONTAMINATION DRILL

TEST ELEMENT	P/F
a. prepare a new decontamination mitt and place it on one of the gloved hands;	
b. decontaminate the other gloved hand (blot, bang rub);	
c. remove the helmet if worn;	
d. decontaminate velcro fastener down to the chest, undo the velcro fastener	
e. push the hood back;	
f. steady breathing, hold last breath keep eyes closed;	
g. unmask;	
h. rapidly but thoroughly decontaminate the following in order. face, ears, neck and hair, and the mask;	
i. repeat if necessary;	
j. decontaminate the head harness and the outside of the mask;	
k. replace and secure the hood and helmet;	
l. decontaminate gloved hand and arm about half way to the elbow and armpit or between legs	
m. remove glove and place under decontaminated armpit or between legs;	
n. decontaminate hand;	

o.	replace glove, secure velcro fastener, remove decontamination mitt from one hand and place on the other gloved hand;	
p.	repeat steps m-p on contaminated hand;	
q.	return decontamination mitt to mask carrier; and	
r.	replace three way detector paper.	

PASS: If all actions are carried out correctly.  
FAIL: If any action is done incorrectly or is omitted.

CHAPTER 13  
MILITARY FIRST AID

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## CHAPTER 14

## APPLY MINE AWARENESS

## GENERAL

1. Mines, booby traps and unexploded ordnance (UXO), defined in Figure 14-1, present constant hazards to soldiers and vehicles on the battlefield, both during hostilities and long after hostilities have ceased. Of these hazards, mines present the greatest danger simply because of the sheer numbers involved. As of 1996, it is estimated that the number of uncleared landmines range between 85-90 million worldwide. The development of **MINE AWARENESS** concerning these hazards will greatly reduce the chance of you being injured or killed by a mine, booby trap or piece of UXO.

HAZARD	DEFINITION
Mine	In land mine warfare, an explosive or material, normally encased, designed to destroy or damage ground vehicles, boats or aircraft, or designed to wound, kill, or otherwise incapacitate personnel. It may be actuated by the action of the victim, by a delay device, or by controlled means.
Booby Trap	An explosive or nonexplosive device or other material, deliberately placed to cause casualties when an apparently harmless object is disturbed, or a normally safe act is performed.

Figure 14-1 Definitions (1 of 2)

Unexploded Ordnance	Explosive ordnance which has been primed, fuzed, armed or otherwise prepared for action, and which has been fired, dropped, launched, projected or placed in such a manner as to constitute a hazard to operations, installations, personnel or material, and remains unexploded either by malfunction or design or for any other cause.
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Figure 14-1 Definitions (2 of 2)

2. Mine, booby trap and UXO awareness includes an understanding of:
  - a. likely locations where these devices may be emplaced;
  - b. indications of the presence of mines, booby traps, or UXO;
  - c. mine, booby trap and UXO avoidance rules;
  - d. procedures and drills employed to extricate oneself from a hazardous area;
  - e. casualty evacuation from mined areas; and
  - f. mine and UXO recognition.
3. Be aware of the potential link between mines, booby traps, and UXO. A mine or UXO may form part of a booby trap.
4. With respect to booby traps, be aware of the alternative methods of activating (Figure 14-2) booby traps. Be aware also that booby traps may be explosive or non-explosive. An understanding of booby trap activation methods will enhance your awareness of the hazard that these devices present.



SER	MECHANISM	DESCRIPTION
(a)	(b)	(c)
1	Pressure	Designed to function upon the application of pressure to some form of fuse mechanism. Be aware of the use of pressure mechanisms under a trip wire to catch a soldier attempting to find the ends of the trip wire.
2	Pressure-release	Designed to function upon the removal of an existing source of pressure.
3	Pull	Trip wire mechanism. The trip wire may be either taut or loose.
4	Tension-release	A taut trip wire which activates the booby trap if the wire is cut. Be aware of the taut trip wire with a combined pull-release mechanism.
5	Delay	Designed to function by some form of delay mechanism. Activation is normally initiated by some form of human intervention, e.g., application of pressure which crushes a vial in a chemical delay fuse.
6	Vibration	Designed to function when vibrated.
7	Completed circuit	Designed to function upon completion of an electrical circuit.
8	Collapsing circuit or breakwire	Designed to function when an electrical circuit is cut. May be combined with some trip wire activated devices.

Figure 14-2 Booby Trap Activation Mechanisms

5. Orientation to, and recognition of, mines, booby traps and UXO which are likely to be encountered in a theatre of operations will form part of pre-deployment training.

#### LIKELY LOCATIONS FOR MINES AND MINEFIELDS

6. Mines may be laid singularly or in a small group called a "mine cluster". When more than one mine is laid it constitutes a minefield. While minefields may be laid in a pattern, individual mines and mine clusters may be laid at random in locations where there is a likelihood of passage of personnel or vehicles. Often these locations are unmarked, unrecorded and known only to local forces.

7. Be aware of the following likely locations for mines and minefields:

- a. in bottlenecks and defiles where damaged vehicles and other obstructions will create road-blocks;
- b. in places suitable for ambushing either vehicles or foot patrols;
- c. on verges of roads and on tracks;
- d. in loose surface tracks where concealment is easier to achieve;
- e. in and around obstacles, e.g., craters, demolished bridges, road-blocks;
- f. in diversions around obstacles;
- g. in likely waiting areas and exits from roads;
- h. in ditches, and around buildings and other places where people are likely to stop for cover or rest, i.e., dead ground around an enemy defensive position, under shade trees, etc.;
- i. in places likely to be used as assembly areas or observation posts;

- j. around abandoned equipment to hamper its recovery and to injure souvenir hunters;
- k. on approaches to defensive positions or locations which might be used for reorganization after a successful attack;
- l. on roads, railways, airfields, ports, and installations to deny their use and delay repairs; and
- m. at likely helicopter landing sites, drop zones and landing zones.

#### **MINE AND MINEFIELD MARKING**

8. Most armies have a convention for the marking of minefields. This may include the use of some kind of fencing/posts with or without signs/notices carrying warnings such as "mines" or "danger" written in one or more languages, or the skull and cross-bones symbol (see Figure 14-3). Mine and minefield markings vary widely, however, and are often improvised using materials at hand.

9. Marking varies by theatre of operations and should be taught as part of a theatre-specific mine awareness briefing. Examples of improvised mine and minefield markings include:

- a. piles of stones;
- b. spray painted trees;
- c. crossed sticks or other items on a path;
- d. bent or broken tree branches over a path;
- e. bent grass which is tied together; and
- f. gasoline cans or other containers placed in obvious locations.

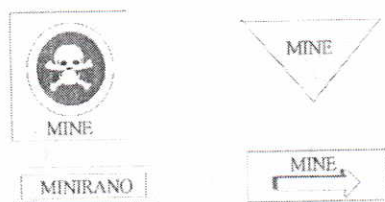


Figure 14-3 Mine and Minefield marking signs

10. **Unmarked Mine and Minefield Indicators.** It is important to note that minefields may remain unmarked either intentionally or because they have been emplaced by remote means (scatterable mines). However, even in the case where a minefield is unmarked, indicators that mines have been laid are often visible.

11. Learn to recognize the following unmarked mine and minefield indicators:

- a. disturbance of the ground surface, particularly on roads and in grass, or loose soil scattered over grass;
- b. trampled earth or vegetation, footmarks, or marks of wheeled or tracked vehicles in a pattern suggesting that a minefield has been laid;
- c. damaged bushes in hedges, scrub, etc., indicating the continuation of a row of mines;
- d. high or low trip wires;

- e. partial blockage of a road by a seemingly harmless obstacle which forces traffic onto the verge;
- f. empty containers of mines and mine components, or explosive packaging, wrappings, and seals, which may have been left deliberately and booby trapped;
- g. human and livestock corpses with missing or severely damaged limbs;
- h. damaged vehicles on the road or on the verge of the road;
- i. unattended fields, particularly those surrounded by agricultural fields which are attended;
- j. unused and overgrown paths and tracks; and
- k. local behaviour, i.e., avoidance of certain areas by the local population.

#### LIKELY LOCATIONS FOR BOOBY TRAPS

12. The majority of booby traps will be found in places where the greatest number of casualties is likely to result.
13. Be aware of the following likely locations for booby traps:
  - a. Recently Occupied Areas. When following a retreating opponent, the following should be suspect.
    - (1) Roads and Railways. Embankments, blind turns, bridges, culverts, obstacles and the area around them, wooded stretches, junctions, and cross roads.
    - (2) Open Country. Woods, trees, posts, gates, paths, hedges, obstacles, stores dumps, fire trenches, shelters and other field fortifications.



- (3) Buildings and shelters. Steps, floors, doors, windows, cupboards, passages, furniture, fireplaces, water taps, toilets, supplies, light switches, floor coverings, pictures and documents.
- b. Rear or Occupied Areas. In rear areas or in occupied territories where there is unrest, the following places are often mined or booby trapped.
  - (1) Railways. The track may be mined with a pressure switch, or destroyed by a charge fired electrically by guerrillas when a train passes. The most likely places are in woods or other defiles or on bridges.
  - (2) Sites of Incidents. After serious incidents such as explosions in buildings or vulnerable points, or after raids on camps and installations, all approaches to the scene may be mined or booby trapped. In addition, anything left behind after the raid must be suspected.
- c. Illegal Arms Caches. Arms caches and other illegal stores may be booby trapped to cause casualties to searchers.

#### BOOBY TRAP INDICATORS

14. The number of clues which might indicate the presence of booby traps is endless.
15. Learn to recognize the following booby trap indicators:
  - a. movable and apparently undamaged equipment and vehicles, food and drink and their containers, kitchen utensils, and anything likely to make a souvenir;
  - b. disturbed ground and small puddles, especially after rain;
  - c. spoil, explosive wrappings, sawdust and nose caps from shells;



- d. footprints in soil, foreign to the nature of the ground, e.g., clay marks, where no clay exists on the surface;
- e. traces of camouflage, withered vegetation, etc, indicating some attempt at concealment;
- f. breaks in the continuity of vegetation, dust, paint-work, timbering, etc;
- g. the presence of pegs, nails, electric leads, pieces of wire or cord for no apparent reason;
- h. marks on trees, on paths, on the ground or on walls of buildings for no apparent reason. Such marks may have been used by enemy reconnaissance parties to indicate sites selected for booby traps;
- i. minor obstructions of all kinds on roads, in trench systems and in buildings, heaps of dead leaves, litter, etc;
- j. irregular foot or wheeled traffic tracks for whose presence there is no apparent reason; and
- k. loose floor boards, signs of digging, recently replaced brickwork in cellars, or hollow sounding walls should all be suspected. These may well be the only clues to the presence of deeply buried delay-action charges.

#### LIKELY LOCATIONS AND INDICATORS OF UXO

16. UXO can be located anywhere on the battlefield. Quantities of UXO may range from single items to large concentrations (e.g., bomblets from air-dropped munitions which have malfunctioned). If not previously marked, the presence of large concentrations of UXO may be indicated by some of the same indicators associated with minefields (e.g., packaging, corpses, damaged vehicles, unattended or unused fields, roads or tracks, and local behaviour).

17. In the case of air-dropped munitions they may be indicated by the presence of released dispensers nearby, however, the distance between dispensers and UXO is dependent on the aircraft speed and the altitude at which they were released.

#### AVOIDANCE

18. **Mine, Booby Trap and UXO Avoidance Rules.** The risk of becoming a mine, booby trap or UXO casualty is reduced by following the following rules:

- a. obtain mine/booby trap/UXO information for your area of operations on a regular basis;
- b. plan your route prior to departure. This will involve determining the routes of minimum risk and known hazardous areas from your supporting mine information centre. Don't forget to mark hazardous areas on your map;
- c. if possible, travel with someone who is familiar with the area;
- d. ensure that your vehicle, packet or convoy, as applicable, has a radio;
- e. unless operationally essential, avoid travelling at night;
- f. stay on known safe surfaces, whether they be cleared buildings, areas or approved routes;
- g. don't drive around obstacles without having an engineer prove the lane clear of mines and booby traps;
- h. don't drive onto road verges or leave hardstand surfaces;
- i. observe minefield markings, i.e., don't cross over mine tape, fencing, etc into a hazardous area;
- j. don't give into curiosity;

k. observe local behaviour; and

l. if you didn't drop it, don't touch it! Report the hazard.

#### **SELF-EXTRICATION**

19. **Actions in a Hazardous Area.** If you find yourself in a mined or UXO covered area, or if indicators tell you that you are in a potentially mined or UXO covered area, and you are not under fire, **remember S.A.N.D.I.:**

**Stop**

**Assess**

**Note**

**Drawback**

**Inform**

20. S.A.N.D.I. involves the following procedures (where applicable, differences between actions when dismounted or mounted are identified):

a. **Stop.**

(1) **Dismounted.** Immediately stand still and order **all** those around you to halt and stand still. This is particularly important if a member of your group has just become a mine casualty because of the natural tendency to rush to the casualty.

(2) **Mounted.** Stop the vehicle or order the driver to halt. Initially, stay in the vehicle.

- b. **Assess.** Visually search the area around you or the vehicle for trip wires, exposed mines or mine fuzes and fuzed ordnance (mortar bombs, shells, rockets, grenades, or bomblets). Assess the ground to determine what route will be followed to drawback or extricate yourself from the hazardous area.
- c. **Note.** Record and if possible report by radio what you see (don't approach and don't touch!). For example, note the shape (square, round, circular, rectangular, cylindrical, domed, Claymore), the colour (light or dark green, brown, black, sandy, grey, metallic, natural wood, olive, blue, white, or disruptive pattern camouflage, including any identifying markings), the material (plastic, rubber, wood, sheet metal, cast iron, metal alloys, concrete, bakelite, cast explosive), and the size (length, width, height, and diameter) of any trip wire, mine, mine component or UXO.
- d. **Drawback.**
  - (1) **Dismounted.** If an engineer clearance team is not available, or circumstances otherwise require an immediate withdrawal, this may involve prodding a path one metre wide to a safe area (where there is an obvious threat). The drawback procedure involves the repetition of the following drills until clear of the area:
    - (a) **Look.** For trip wires, mines or indicators.
    - (b) **Check for trip wires.** Using the push rod from your weapon as a trip wire feeler, held gently between your thumb and first finger, slowly push the rod forward of you at ground level supported by your other hand. Then slowly raise the rod to a level well above your head when standing. Repeat the procedure on the left side, centre and right side of the one metre path you wish to clear. Then holding the rod vertically, slowly sweep the rod across the 1 metre path you wish to clear. This procedure will ensure the detection of any trip wires running either

parallel to or across the path you wish to clear. If you encounter a trip wire, do not attempt to clear it. Clear a path along the trip wire to one end or to a location where it can be safely crossed and then continue clearing a path to the desired destination. In certain cases, it may be necessary to select another drawback route if the hazard presented by a trip wire(s) is too great. Physically check for trip wires after looking. Some trip wires are so thin, they are virtually undetectable or may be hidden by vegetation.

- (c) **Feel.** In either a prone or kneeling position. Gently feel the ground across the one metre path for mine fuzes or tops of mines.
  - (d) **Prod.** In either a prone or kneeling position. Using a bayonet, knife, screw driver, or a section of cleaning rod from the C7 rifle, prod the ground (gently push the prodder into the ground until its tip meets resistance or until fully inserted) at 2 cm intervals, and at a maximum angle of 30 degrees to the horizontal (see Figure 14-4), across the full width of the path. Prod another row one cm beyond the previous row and staggered one cm to the left or right of the pattern in the previous row. This pattern of prodding is continued so that every square cm of path is prodded and no mines are missed. **Don't rush! It is not worth missing a mine for the sake of speed.**
  - (e) **Mark.** If resistance is met by the prodder. Mark the spot using foot powder, string, paper, rocks, sticks or anything you have available, and carefully by-pass the area to the left or right. Mark any suspected mines **and** the path followed to safety as best you can.
- (2) **Mounted.** If an engineer clearance team is not available, or circumstances otherwise require an immediate withdrawal, then exit the vehicle via the rear or over the roof to the rear



(don't step down from the side of the vehicle). Step into the vehicle tracks created by your vehicle or others in your convoy and withdraw to safety in the vehicle tracks, using the dismounted drawback procedure described above. Any trip wires should have been tripped by the passage of vehicles, but visually search for them anyway. The dismounted drawback procedure is used because mines have been known not to function in spite of having been driven over by a vehicle(s). If there are no vehicle tracks because the road is hard packed, then withdraw on the hard packed surface avoiding any soft, disturbed, damaged or freshly repaired areas. Mark your withdrawal path as best as possible.

- e. Inform. Once clear of the hazardous area, sign or mark the approach, record the location on your map, and report this information to your headquarters. If a mounted approach, alert other vehicles by marking the distance to the halt point on the warning sign.



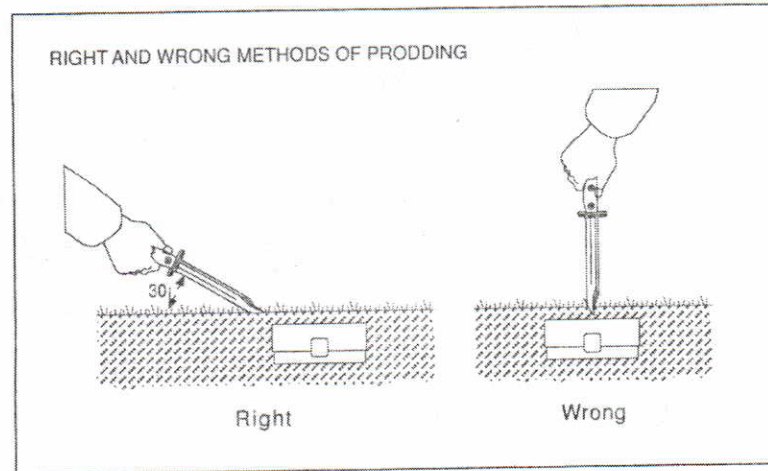


Figure 14-4 Prodding Drill

### CASUALTY RECOVERY

21. Often, the first indicator that you are in a mined or otherwise dangerous area will be a personnel or vehicle casualty. Keep in mind that our first reaction is to run to the aid of a casualty. This urge must be overcome so that you and others with you do not become casualties.

22. **Don't panic! Control those around you:**

- a. Immediate actions are S.A.N.D.I. as described above for yourself and for other non-casualties in the area. When in a group, attempt to keep as much distance as possible between personnel (minimum 20 metres, where physically possible) and to stay as close to the ground as possible except when performing the trip wire feeler drill. Continually reassure the casualty that you are coming and to stay as still as possible.

- b. Clear a path to the casualty. If there are more personnel at the site than just yourself and the casualty, then another person(s) should be assigned to clearing a path which will join the closest known safe area to the path being cleared to the casualty. Maintain the minimum safe distance between personnel when clearing the path.
  - c. Clear an area around the casualty to permit people to move safely around the casualty while administering first aid and to verify that the casualty is not lying over top of another mine.
  - d. **Now** that it is safe, provide first aid.
  - e. Evacuate the casualty along the cleared path. If you and the casualty are the only personnel at the site, then you must finish clearing a path to the closest known safe area before evacuating the casualty.
  - f. Complete the reporting process if the casualty had the group's radio communications.
23. If the casualty is immediately beside you when the mine strike occurs, e.g., the casualty is in the same vehicle, it is possible to administer first aid immediately because it is safe to approach the casualty.
24. Remember, when you find yourself in this situation and you are not under direct or observed fire, take your time. **Don't rush since it may cause you to become a casualty yourself.** Whenever possible, call for combat engineer and medical help as soon as possible.

#### MINE AND UXO RECOGNITION

25. As previously discussed under actions in a hazardous area, mines and UXO can be recognized, classified and ultimately identified by observing and recording their shape, colour, material and size. Generally speaking there is a relative size difference between antipersonnel (A pers) and antitank (AT) mines. A pers mines are small

and contain small amounts of explosive. AT mines are big and contain larger amounts of explosive.

26. All arms should be capable of recognizing mines and UXO by **classification** for reporting purposes (sub-classification details described below are for information purposes).

27. **Mines.** There are two principal classes of mines with sub-classifications:

a. **Antipersonnel Mines** - Subdivided into four sub-classifications (see Figure 14-5):

- (1) **Blast.** Mines placed on or near the surface of the ground, designed to maim or kill by the blast effects of the explosion. All blast mines also have some fragmentation effect as the mine body or casing breaks up under blast and heat.
- (2) **Fragmentation.** Cast metal bodied mines, normally placed on or above the ground surface (i.e., on sticks), and normally attached to a trip wire mechanism, designed to kill or wound by fragmentation of the cast metal body.
- (3) **Bounding Fragmentation.** Metal and plastic mines, normally partially buried in the ground, employing pressure and trip wire mechanisms. When the fuze is actuated, the mine body containing the main charge and any fragmentation material is propelled upwards before exploding into metal fragments or scattering preformed metal pellets.
- (4) **Directional Fragmentation.** Metal and plastic mines, positioned at or above ground level and aimed at a specific target area. It is designed to operate either by trip wire or by remote control (electric/command actuation), firing steel pellets in an expanding arc at the target area.

- b. **Anti-tank Mines.** Mines fabricated from various materials designed to disable or destroy armoured vehicles. AT mines (see Figure 14-5) are classified as either blast (designed to blow of the track or a wheel) or penetration (by explosively formed jet or metal slug). Generally, they are much larger than A pers mines and, unless modified, they are not easily actuated by personnel. AT mines can have antidisturbance devices attached, and in this instance will act as a large A pers mine. Some AT mines can be modified or damaged to reduce the required contact pressure such that a fully kitted soldier may actuate the device, again making the AT mine act like a large A pers mine.

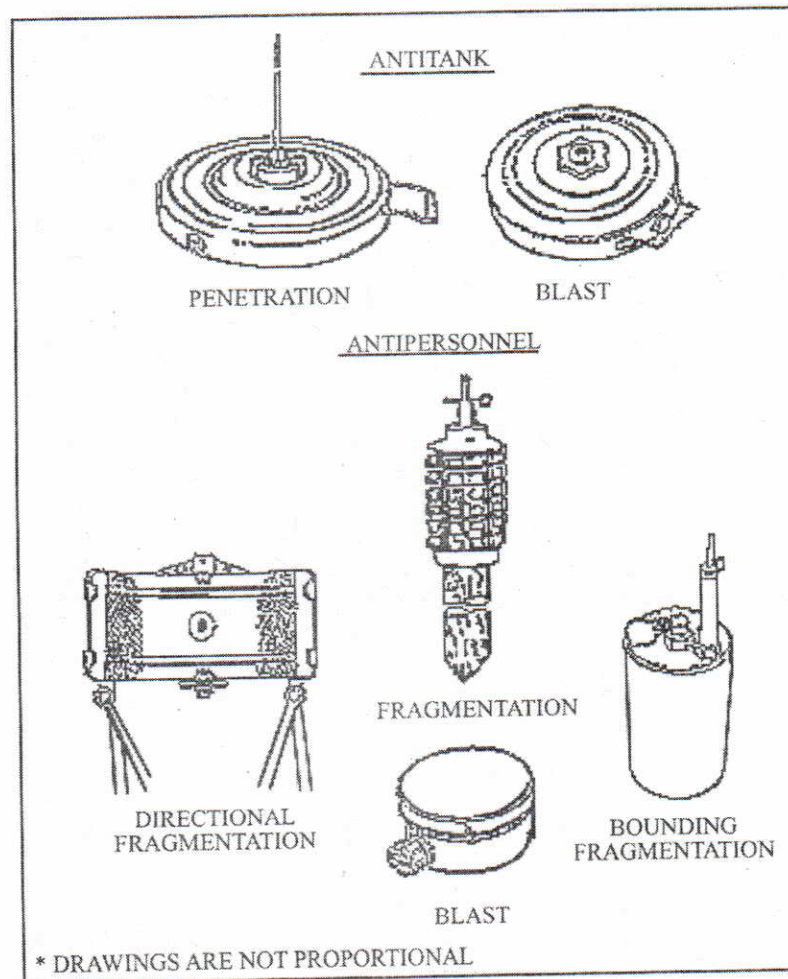


Figure 14-5 Antipersonnel and Anti-tank Mines



28. **UXO.** There are seven classifications of UXO commonly found in theatre of operations:

- a. **Grenades** (see Figure 14-6):
- (1) Rifle launched grenades, and
  - (2) Hand grenades.

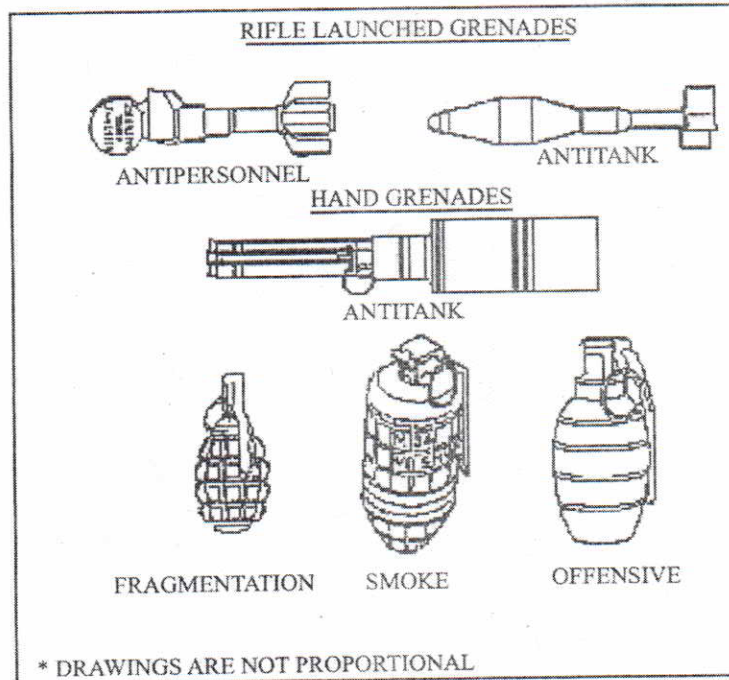


Figure 14-6 Grenades



b. **Projectiles** (see Figure 14-7):

- (1) Tank projectiles,
- (2) Artillery projectiles,
- (3) Mortar projectiles, and
- (4) Recoilless projectiles.

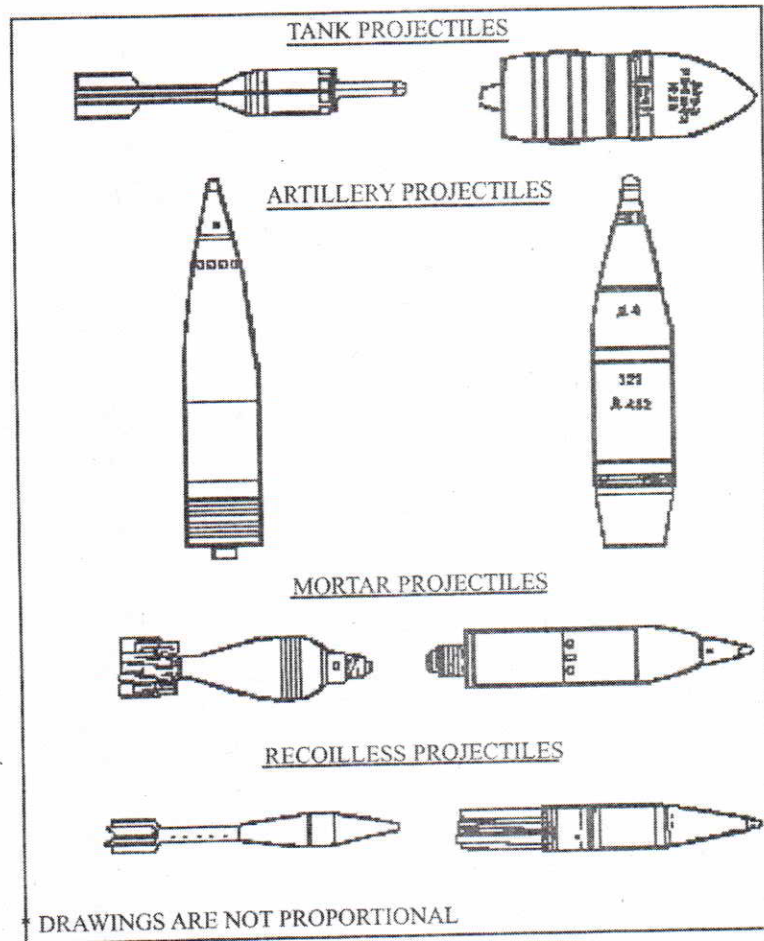


Figure 14-7 Projectiles

c. **Rockets** (see Figure 14-8).

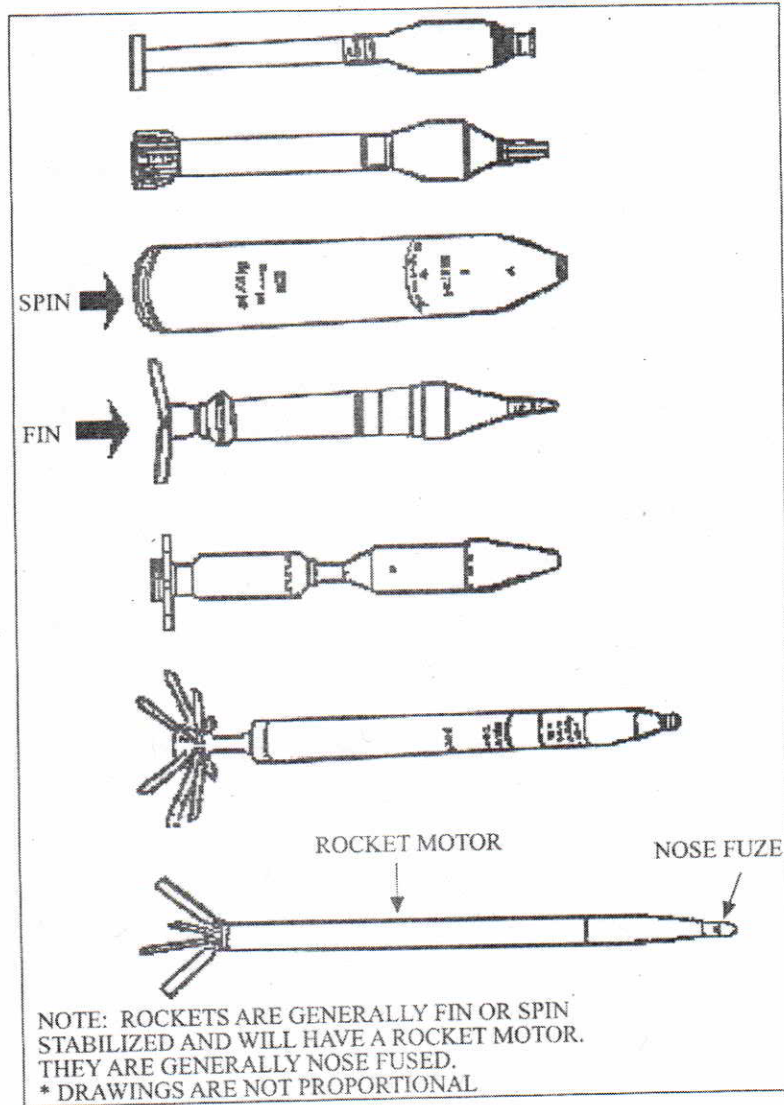


Figure 14-8 Rockets

d. **Dispensers of rockets and submunitions** (see Figure 14-9):

- (1) Static Dispensers (normally meant to remain fixed to aircraft such as rocket or can pods), and
- (2) Released Dispensers, such as canisters dropped from aircraft which then dispense submunitions e.g., bomblets.

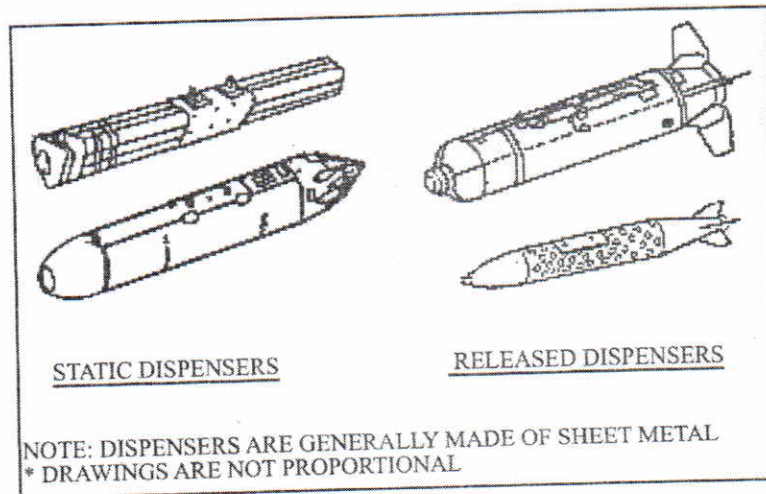


Figure 14-9 Dispensers

e. **Submunitions** (see Figure 14-10):

- (1) Grenades,
- (2) Mines, and
- (3) Bomblets.

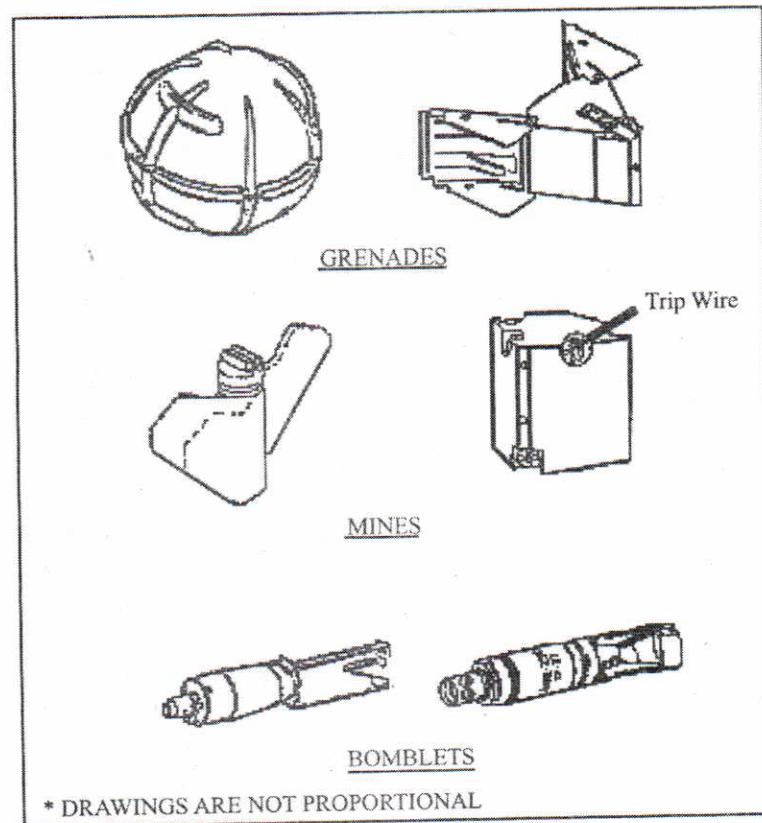


Figure 14-10 Submunitions

f. **General Purpose Bombs** (see Figure 14-11).

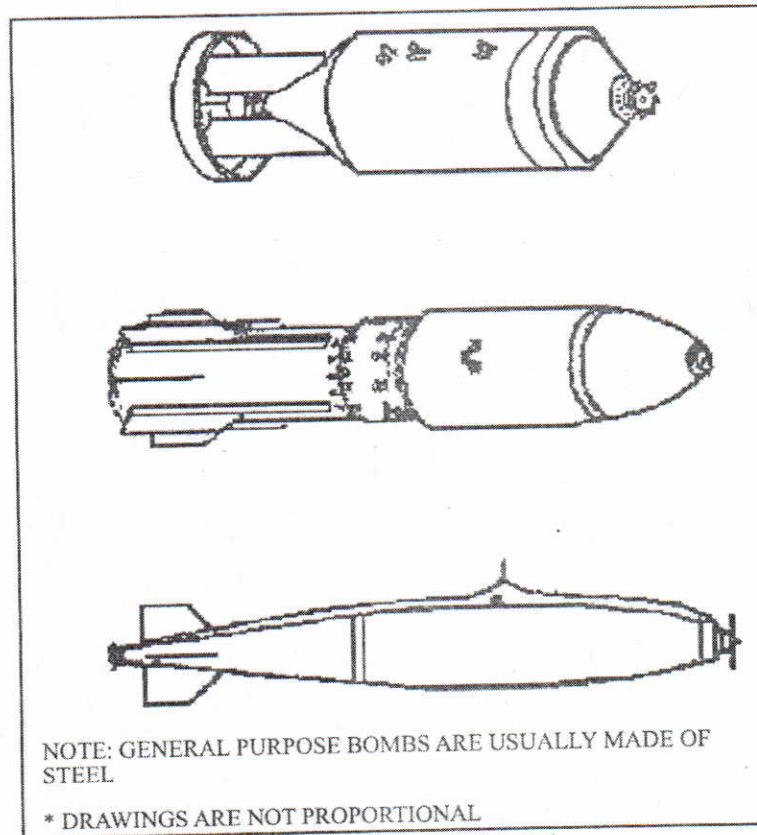


Figure 14-11 General Purpose Bombs



g. **Missiles** (see Figure 14-12):

- (1) Surface to Surface, (SSM),
- (2) Air to Surface, (ASM),
- (3) Surface to Air, (SAM) and
- (4) Air to Air, (AAM).

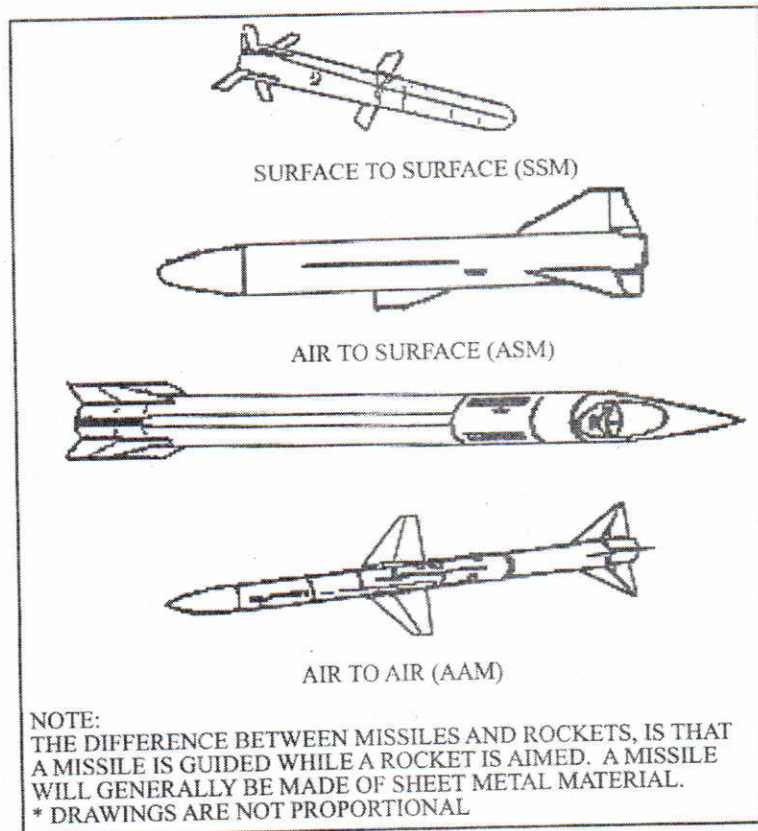


Figure 14-12 Missiles

## CHAPTER 15

## ENVIRONMENTAL PROTECTION

## TRAINING AREA PROTECTION

1. Environmental regulations apply to all military personnel, regardless of rank. Environmental protection is therefore every soldier's responsibility. It is achieved through compliance with Range Standing Orders and other regulations. You have the challenge of weighting your mission during training exercises against the unnecessary destruction of the environment. Following these simple rules will help:

- a. Camouflage. When vegetation is required for camouflage, avoid cutting or damaging live vegetation unnecessarily. Some areas allow you to cut saplings under 5cm/2in in diameter within authorized areas as directed by range control;
- b. Bivouacs. Keep your bivouac areas clean. Collect and deposit all trash and discarded materials in designated areas and containers. Do not burn or bury them;
- c. POL. Never bury or dump POL in the field or into a watercourse, dispose of it in designated areas. Always report promptly the size, location and type of any significant POL spill in accordance with Range Standing Orders and try to contain it until assistance arrives when required; and
- d. Vehicle Movement. Follow all posted speed limits. Vehicles must cross rivers/streams at authorized crossing sites only. Tracked vehicle drivers should avoid sharp pivot turns unless absolutely required for tactical purposes and to keep to tank trails especially during administrative moves.

**GENERAL PRECAUTIONS**

2. The following general precautions should be kept in mind whenever you are working out of doors and in training areas:

- a. Respect the fire prevention index and report any fires promptly to Range Control;
- b. Avoid all out of bounds or restricted areas.;
- c. Dig all field latrines in authorized locations only. When in doubt, contact your supervisor or Range Control;
- d. Refill and compact all excavations before leaving the training area; and
- e. Do not feed or harass wildlife.

**YOUR POINT OF CONTACT CONCERNING THE ENVIRONMENT  
IN THE TRAINING AREA IS THE RANGE CONTROL OFFICER**